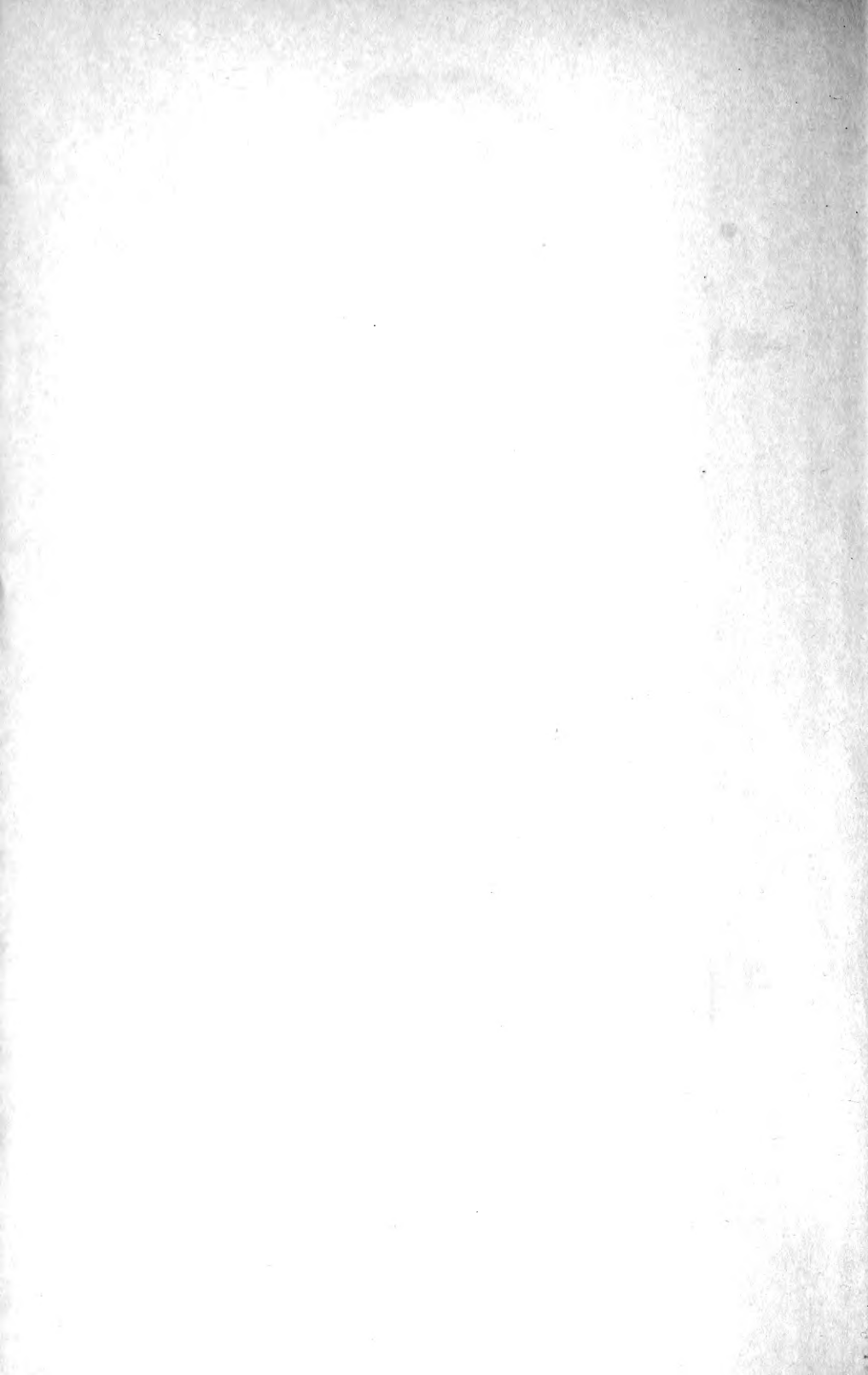


PROCEEDINGS

OF THE



PROCEEDINGS

OF THE

Biological Society of Washington

VOLUME 68

1955

WASHINGTON
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PUBLICATION NOTE

By a change in the By-Laws of the Biological Society of Washington, effective March 27, 1926, the fiscal year now begins in May, and the officers will henceforth hold office from May to May. This, however, will make no change in the volumes of the Proceedings, which will continue to coincide with the calendar year. In order to furnish desired information, the title page of the current volume and the list of newly elected officers and committees will hereafter be published soon after the annual election in May.

All correspondence should be addressed to the Biological Society of Washington, % U. S. National Museum, Washington, D. C.

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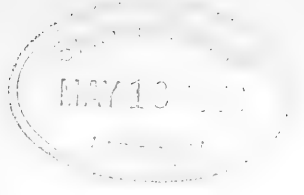


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**PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON**

PROCEEDINGS

The Society has held two meetings during the year, both in Room 43 of the U. S. National Museum.

**May 19, 1955—1019th Meeting
SEVENTY SIXTH ANNUAL MEETING**

President Deignan in the chair; 23 persons present.

The reports of the Recording Secretary and Treasurer were presented, and informal reports were made by the Corresponding Secretary and the Editor.

The following officials and members of Council were elected:

President, Hugh T. O'Neill; Vice Presidents, Alan Stone, Herbert Friedmann, Howard B. Owens, D. H. Johnson; Recording Secretary, S. F. Blake; Corresponding Secretary, Gorman M. Bond; Treasurer, Allen J. Duvall; Members of Council, Louise M. Russell, Charles O. Handley, Jr., Maurice K. Brady, Albert C. Smith, Viola S. Schantz.

The business meeting was followed by a paper: H. G. Deignan, Adventures in Thailand.

December 6, 1955—1020th Meeting

Joint meeting with Entomological Society of Washington.

Formal communication: W. F. Knipling, Eradication of screw-worm by introduction of gammaradiated males into the field.

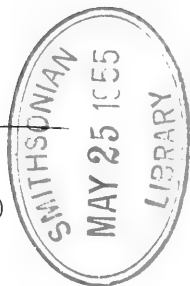
PROCEEDINGS
OF THE
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THREE NEW PIKAS (*GENUS OCHOTONA*)
FROM UTAH

BY STEPHEN D. DURRANT AND M. RAYMOND LEE

In his Mammals of Utah, Durrant (Univ. Kansas Publs., Mus. Nat. Hist., 6:67-73, August 10, 1952) recognized 5 subspecies of *Ochotona princeps* (Richardson) as occurring in Utah. While Durrant's manuscript was in press, Gardner (Journ. Washington Acad. Sci., 40:344, October 15, 1950) named *Ochotona princeps moorei* from the Wasatch Plateau. Durrant (*op. cit.*:70) previously studied two of the specimens upon which Gardner based the name *Ochotona princeps moorei* and although he recognized differences, owing to the paucity of specimens, he referred them to *O. p. cinnamomea*. Recent acquisitions of additional specimens from critical areas and also from areas from which these animals had not been previously recorded, indicate the existence in Utah of three heretofore undescribed subspecies of the aforementioned species. Moreover, our studies confirm that the animals from the Wasatch Plateau belong to *O. p. moorei* and not to *O. p. cinnamomea* as indicated by Durrant. Of the 5 subspecies mentioned by Durrant (*op. cit.*:67-73), only 4 are now known to occur in Utah, because no animals from Utah are now known to be referable to *O. p. saxatilis*. The addition of the three new kinds herein described and named indicate that the pikas from Utah now belong to eight subspecies.

For the loan of comparative material we are indebted to the following: Seth B. Benson, Museum of Vertebrate Zoology, University of California, Berkeley, California; Viola S. Schantz and John W. Aldrich, U. S. National Museum, Washington, D. C.; Albert C. Rogers, and Alfred M. Bailey, Denver Museum of Natural History, Denver, Colorado; Vasec M. Tanner and C. Lynn Hayward, Department of Zoology, Brigham Young University, Provo, Utah. Unless otherwise indicated all measurements are in millimeters. Capitalized color terms are after Ridgway (Color Standards and Color Nomenclature, Washington, D. C., 1912). Part of this study was made under a research grant by the National Science Foundation.



***Ochotona princeps wasatchensis*, new subspecies**

Type.—Male, adult, skin and skull, number 4787, Museum of Zoology, University of Utah; 10 miles above lower powerhouse, road to Cardiff Mine, Big Cottonwood Canyon, Salt Lake County, Utah; June 24, 1946; collected by J. Berryman; original number 1.

Range.—Southern Wasatch Mountains, limits unknown.

Diagnosis.—*Color: Summer pelage*: Sides and upper parts near Light Ochraceous Buff (some specimens approach Warm Buff), back darker than sides owing to moderate suffusion of dark hairs; top of head between Cinnamon Buff and Clay Color; underparts Light Buff to Warm Buff; upper surface of fore and hind feet between Light Buff and Warm Buff; subauricular and postauricular regions Light Ochraceous Buff surrounded by Cinnamon-Buff; inner and outer surfaces of ears black; margins of ears whitish. *Winter pelage*: Darker than summer; sides and upper parts near Pinkish Buff moderately suffused with brown; subauricular and postauricular regions particularly less distinctive; top of head notably darker. *Skull*: Rostrum short; nasals short with straight lateral margins; orbit small; maxillary fenestrae small and subcircular; proximal ends of nasals rounded; anterior margin of palatal bridge concave; zygomata parallel; palatal bridge narrow.

Comparisons.—In color, topotypes of *O. p. wasatchensis* differs from both topotypes of *O. p. clamosa* and near topotypes of *O. p. vinta* as follows: Lighter; subauricular and postauricular regions markedly lighter, general appearance buffy as opposed to pinkish cinnamon; sides and upper parts near Light Ochraceous-Buff with comparatively little suffusion of dark hairs, as opposed to near Light Pinkish Cinnamon or approaching Pinkish Buff with a predominance of dark hairs; top of head with less suffusion of dark hairs; upper surfaces of fore and hind feet with more buff.

From topotypes of *Ochotona princeps clamosa*, topotypes of *O. p. wasatchensis* differ as follows: *Size*: Smaller; ears longer. *Skull*: Posterior ends of nasals wider; zygomata parallel as opposed to divergent posteriorly; coronal suture square as opposed to rounded; maxillary fenestrae average smaller and relatively wider (dorso-ventrally); palatal bridge wider (antero-posteriorly); posterior margin of palatal bridge evenly rounded as opposed to V-shaped; width of molariform teeth less; antero-ventral processes of zygomata projecting less laterad; tympanic bullae markedly less inflated ventrally; interptergoid space narrower; infraorbital foramen oval as opposed to elongate dorso-ventrally.

Comparisons of topotypes of *O. p. wasatchensis* with near topotypes of *Ochotona princeps vinta* show the former to possess the following differences: *Size*: Smaller; ear and hind foot longer. *Skull*: Smaller in most measurements; rostrum shorter, but relatively wider; nasals shorter, lateral margins straight as opposed to slightly concave; orbit markedly smaller; zygomatic breadth less; posterior ends of nasals round as opposed to wedge-shaped; posterior outline of skull in dorsal view, rounded as opposed to wedge-shaped; maxillary fenestrae markedly smaller and of different shape, being shorter but actually as well as relatively wider (dorso-ventrally); zygomata weaker; masseteric fossa of the zygoma shorter and narrower; palatine vacuities larger; anterior margin of palatal bridge markedly concave as opposed to nearly straight;

palatal bridge markedly wider (antero-posteriorly); alveolar length of upper molariform teeth shorter; basioccipital narrower and shorter; width across exoccipital processes less; tympanic bullae shorter (antero-posteriorly) but more inflated ventrally.

Characters that distinguish topotypes of *O. p. wasatchensis* from near topotypes of *Ochotona princeps moorei* are as follows: Ear and hind foot longer. *Color*: Darker; general appearance buffy as opposed to buffy gray; upper parts near Light Ochraceous-Buff as opposed to Pale Ochraceous-Buff. *Skull*: Lateral margins of nasals straight and not expanded anteriorly as opposed to concave and expanded anteriorly; posterior ends of nasals round as opposed to moderately wedge-shaped; in dorsal view, outline of lower margin of maxillary fenestrae concave as opposed to straight or slightly convex; posterior ends of nasals extend relatively further caudad; lateral margins of zygomatics approximately straight as opposed to slightly convex; width of zygoma at union of zygomatic process of squamosal and jugal less; maxillary fenestrae shorter but relatively wider (dorso-ventrally); palatine vacuities larger and "teardrop" shaped as opposed to nearly oval; posterior end of palatine vacuities relatively wider; posterior margin of palatal bridge concave as opposed to straight or slightly convex; interpterygoid space narrower; tympanic bullae smaller.

For comparisons of topotypes of *O. p. wasatchensis* with animals from the Fishlake Plateau and with those from the La Sal Mountains, see accounts under the new subspecies herein described from these localities.

Topotypes of *O. p. wasatchensis* differ from near topotypes of *Ochotona princeps utahensis* as follows: *Size*: Markedly smaller; ear longer. *Color*: Lighter throughout (general appearance buffy as opposed to grayish). *Skull*: Smaller; lateral margins of nasals straight as opposed to concave; anterior ends of nasals not inflated as opposed to inflated; rostrum shorter; maxillary fenestrae markedly smaller; orbit longer; palatine vacuities larger; anterior margin of palatal bridge concave as opposed to nearly straight (some specimens have a median caudal process); interpterygoid space shorter; basioccipital shorter.

Topotypes of *O. p. wasatchensis* can be easily distinguished from those of *Ochotona princeps fuscipes* and *Ochotona princeps cinnamomea* as follows: *Size*: Larger than *O. p. cinnamomea*. *Color*: Lighter; general appearance buffy as opposed to pinkish or cinnamon; head buffy as opposed to grayish. *Skull*: Larger; nasals markedly longer; orbit longer; palatal bridge markedly wider (antero-posteriorly); alveolar length of upper molariform teeth greater; interpterygoid space narrower.

Topotypes of *O. p. wasatchensis* can be distinguished from those of *O. p. figginsi* as follows: *Size*: Larger. *Color*: Upper parts lighter; sides and upper parts buffy as opposed to cinnamon; underparts lighter. *Skull*: Occipitonasal length greater; lateral margins of nasals straight as opposed to slightly concave; orbit wider; maxillary fenestrae markedly smaller; basioccipital shorter.

Comparisons of topotypes of *O. p. wasatchensis* with topotypes of *Ochotona princeps saxatilis* show the former to differ as follows: *Color*: Lighter, upper parts Light Ochraceous-Buff as opposed to Light Buff; dorsum lighter owing to less suffusion of dark hairs; under parts more buffy. *Skull*: Occipitonasal length less; lateral margins of nasals straight

as opposed to concave; posterior half of nasals markedly wider; orbit longer; maxillary fenestrae shorter but relatively wider; posterior processes of zygomata shorter and narrower; anterior margin of palatal bridge more concave; breadth of braincase less; basioccipital markedly narrower; tympanic bullae larger.

Specimens examined.—Total, 27, distributed as follows: *Salt Lake County*: Silver Lake Post Office (Brighton), 9,000 feet, 3; Silver Lake, Big Cottonwood Canyon, 8,700 feet, 1; near Lake Solitude, Silver Lake Post Office (Brighton), 9,000 feet, 1; 10 miles above lower powerhouse, road to Cardiff Mine, Big Cottonwood Canyon, 1; Big Cottonwood Canyon, 1½ miles down canyon from "The Spruces", 1; 2 miles above Alta, 6; Mountain Lake, near Alta, 10,000 feet, 1; Little Cottonwood Canyon, 6 miles above Wasatch Boulevard, 1; Big Willow Canyon, 7,000 feet, 1. *Utah County*: Mt. Timpanogos, 11 (B.Y.U.).

Ochotona princeps lasalensis, new subspecies

Type.—Male, adult, skin and skull, number 6409, Museum of Zoology, University of Utah; Warner Ranger Station, 9,750 feet, La Sal Mountains, Grand County, Utah; June 23, 1948; collected by Keith R. Kelson; original number 531.

Range.—La Sal Mountains of Eastern Utah.

Diagnosis.—*Color*: *Winter pelage* (worn): Sides and upperparts Pinkish Buff, dorsum darker because of greater admixture of brown hairs; underparts Pale Pinkish-Buff; general appearance of animals buffy gray as a result of exposure of under fur; upper surfaces of fore and hind feet between Pale Pinkish Buff and Pinkish Buff; subauricular region near Light Ochraceous-Buff; inner surface of ears approaching Mummy Brown, with light scattering of buffy hairs; margins of ears whitish with longer hairs on anterior margins pale buffy; top of head grayish to pale buffy, with moderate mixture of brownish hairs. *Skull*: Rostrum wide; nasals long and narrow posteriorly; antero-lateral margin of zygomatic arch angular and concave; orbit wide; posterior margin of orbital plate of maxillary containing alveoli of last two upper cheek teeth, bilobed; masseteric fossae of zygomata long, and wide posteriorly; anterior margin of palatal bridge straight; alveolar length of upper molariform teeth markedly long; width of molars markedly wide.

Comparisons.—*Ochotona princeps lasalensis* can be distinguished from all subspecies studied as follows: *Skull*: Antero-lateral margins of zygomata angular and slightly concave as opposed to evenly rounded and convex; posterior margin of orbital plate of maxillary containing alveoli of last two upper cheek teeth, highly elevated and bilobed as opposed to having only one distinct lobe; alveolar length of upper molariform teeth greater; posterior ends of nasals narrower.

With the exception of animals referable to *O. p. vinta* and *O. p. utahensis*, those of *O. p. lasalensis* differ from all others studied in having longer nasals. Furthermore, with the exception of specimens of *O. p. clamosa*, *O. p. fuscipes* and *O. p. cinnamomea*, those referable to *O. p. lasalensis* differ from all others studied in having a markedly wider posterior region of the masseteric fossa.

The nearest subspecies geographically and morphologically to *O. p. lasalensis* is *Ochotona princeps saxatilis*. Topotypes of *O. p. lasalensis*

can be distinguished from those of *O. p. saxatilis* as follows: Ears shorter. *Color*: Sides and upper parts Pinkish Buff as opposed to near Light Buff (one specimen Ivory Yellow); upper parts darker with greater admixture of brown; subauricular region near Light Ochraceous-Buff, as opposed to Warm Buff; inner surfaces of ears darker; region between nose and vibrissae grayish as opposed to yellowish or buffy. *Skull*: Rostrum wider; orbit markedly wider; zygomatic breadth greater; anterior margin of palatal bridge straight as opposed to slightly concave; basioccipital narrower; tympanic bullae more inflated ventrally; width of molariform teeth markedly greater; dorsal margin of foramen magnum more deeply concave.

Topotypes of *O. p. lasalensis* can be distinguished from those of *Ochotona princeps figginsii* as follows: *Color*: Lighter, sides and upper parts Pinkish Buff as opposed to between Cinnamon-Buff and Cinnamon; dorsum lighter with less admixture of dark brown; subauricular region near Light Ochraceous-Buff as opposed to near Clay Color; head grayish buffy as opposed to browish cinnamon; underparts lighter. *Skull*: Rostrum wider; premaxillae extend further caudad; posterior margin of parietals and interparietal rounded as opposed to pointed or square; orbit wider; anterior margin of palatal bridge straight as opposed to concave; ventral tips of exoccipital processes wider; palatal bridge wider; width of cheek teeth greater.

Comparison of topotypes of *O. p. lasalensis* with specimens of *Ochotona princeps winta* show the following: *Size*: Smaller. *Color*: Lighter; sides and upper parts near Pinkish Buff as opposed to Light Pinkish Cinnamon, underparts lighter; head less brownish. *Skull*: Orbit shorter; coronal suture square as opposed to rounded; maxillary fenestrae slightly smaller; palatal bridge wider (antero-posteriorly).

Topotypes of *O. p. lasalensis* differ from those of *Ochotona princeps wasatchensis* as follows: *Color*: More uniformly buffy grayish; sides and upperparts near Pinkish Buff as opposed to Light Ochraceous-Buff; head markedly grayer. *Skull*: Zygomatic breadth greater; rostrum longer; frontal processes of premaxillae extend further caudad; maxillary fenestrae larger; zygomata heavier; anterior margin of palatal bridge straight as opposed to concave; palatal bridge markedly wider; tympanic bullae larger.

The following characters distinguish topotypes of *O. p. lasalensis* from those of *Ochotona princeps clamosa*: *Size*: Slightly smaller, ear longer. *Color*: Differs in color from *O. p. clamosa* as it does from *O. p. winta*. *Skull*: Rostrum markedly longer; maxillary fenestrae markedly larger; anterior margin of palatal bridge straight as opposed to concave; palatal bridge markedly wider (antero-posteriorly); median ventral ridge of basioccipital less pronounced.

Topotypes of *O. p. lasalensis* can be distinguished from those of *Ochotona princeps moorei* as follows: *Color*: General appearance buffy as opposed to grayish buffy; sides and upper parts Pinkish Buff as opposed to Pale Ochraceous-Buff. *Skull*: Rostrum longer; lateral margins of nasals straight as opposed to concave; maxillary fenestrae larger; masseteric fossa of zygoma longer and shallower; anterior margin of palatal bridge straight as opposed to concave; palatine vacuities larger; sphenopalatine vacuities shorter; tympanic bullae shorter.

Comparison of topotypes of *O. p. lasalensis* with near topotypes of *Ochotona princeps utahensis* show the following: *Size*: Smaller. *Color*: Lighter, buffy as opposed to grayish. *Skull*: Masseteric fossa of zygomatic arch shallower; zygomatic arch heavier; palatal bridge wider (antero-posteriorly); sphenopalatine vacuities longer.

Topotypes of *O. p. lasalensis* differ from those of *Ochotona princeps cinnamomea* and near topotypes of *O. p. fuscipes* as follows: *Size*: Larger. *Color*: Lighter; general appearance buffy as opposed to cinnamon or pinkish cinnamon; head buffy as opposed to grayish. *Skull*: Larger in nearly all measurements taken; rostrum longer; palatal bridge markedly wider (antero-posteriorly); width of basioccipital greater; tympanic bullae larger.

Comparison of *O. p. lasalensis* with animals from the Fishlake Plateau are given under the account of the new subspecies named from there. *Specimens examined*.—Total, 14, distributed as follows: *Grand County*: $\frac{1}{2}$ mile, N Warner R. S., La Sal Mountains, 9,000 feet, 1; Warner R. S., 9,750 feet, La Sal Mountains, 5 (1, B.Y.U.); $\frac{1}{2}$ mile S Warner R. S., La Sal Mountains, 9,700 feet, 1. *San Juan County*: Mt. Mellithin, La Sal Mountains, 12,280 feet, 2 (B.Y.U.); Geyser Pass, La Sal Mountains, 5 (B.Y.U.).

Ochotona princeps barnesi, new subspecies

Type.—Male, adult, skin and skull, number 8140, Museum of Zoology, University of Utah; Johnson's Reservoir, 8,800 feet, 15 miles north of Loa (Fishlake Plateau), Sevier County, Utah; August 23, 1952; collected by M. Raymond Lee; original number, 123.

Range.—Fishlake Plateau and environs.

Diagnosis.—*Size*: Large (see measurements). *Color*: *Summer pelage*: Dark; sides and back near Pinkish Buff with moderate suffusion of dark brown; top of head Pinkish Buff with moderate suffusion of Sepia; ears dark brown, margins whitish; subauricular patch large, center Pinkish Buff surrounded by near Cinnamon; upper surface of fore and hind feet near Pinkish Buff; underparts Pinkish Buff to Clay Color, darkest in pectoral region. *Winter pelage*: Grayer throughout. *Skull*: Large; nasals markedly inflated anteriorly; rostrum deep with concave dorsal surface; upper incisors long and procumbent; palatine vacuities large and in approximately one-half of the specimens examined, asymmetrical (right-half larger than left); interpterygoid space narrow; basioccipital long and wide; braincase deep.

Comparisons.—Both cranial and external measurements show animals belonging to *Ochotona princeps barnesi* to be the largest of any of the pikas studied.

Topotypes of *O. p. barnesi* differ from near topotypes of *O. p. utahensis* as follows: *Size*: Total length greater; ears longer. *Color*: Sides and upper parts slightly lighter (some specimens indistinguishable); top of head lighter (moderately washed with Sepia as opposed to heavily washed with Sepia); underparts lighter, particularly pectoral region (between Cinnamon-Buff and Clay Color as opposed to near Sayal Brown). *Skull*: Averages larger in nearly all measurements taken; nasals markedly inflated anteriorly as opposed to slightly inflated; in dorsal outline rostrum slightly concave as opposed to convex; incisors

longer, wider and more procumbent; sphenopalatine vacuities longer; palatal bridge wider; rostrum deeper; depth of braincase over bullae greater; interpterygoid space narrower. Differences in the following features were found to be statistically significant between the two aforementioned subspecies: Total length, length of ear, basilar length, length of incisors, length of basioccipital, depth of braincase, depth of rostrum.

From specimens of *Ochotona princeps moorei* topotypes *O. p. barnesi* differs as follows: *Size*: Larger. *Color*: Darker; upper parts near Pinkish Buff as opposed to Pale Ochraceous-Buff; suffusion of brown on sides and upper parts greater. *Skull*: Markedly larger in nearly all measurements; nasals longer and markedly inflated anteriorly as opposed to shorter with anterior ends expanded laterally; rostrum longer; incisors markedly longer; maxillary fenestrae markedly larger; palatine vacuities larger; posterior border of palatal bridge concave as opposed to straight; tympanic bullae larger.

The following characters distinguish topotypes of *O. p. barnesi* from those of *O. p. cinnamomea* and *O. p. fuscipes*: *Size*: Larger. *Color*: Head brownish as opposed to grayish; sides and upper parts Pinkish Buff as opposed to Cinnamon or Pinkish Cinnamon. *Skull*: Markedly larger in nearly all measurements; nasals longer and inflated anteriorly; maxillary fenestrae markedly larger; orbit larger; palatal bridge wider; interpterygoid space relatively narrower; upper incisors longer and more procumbent; tympanic bullae larger and more inflated ventally.

Comparisons of topotypes of *O. p. barnesi* with specimens of *O. p. uinta* show the former to be much more closely related to *O. p. uinta* than to either *O. p. cinnamomea* or *O. p. fuscipes*. Characters of significance show topotypes of *O. p. barnesi* to differ from *O. p. uinta* from several localities in the Uinta Mountains as follows: *Size*: Slightly larger. *Color*: General appearance grayer; side and upper parts buffy as opposed to cinnamon buffy. *Skull*: Nasals longer and more inflated anteriorly; interorbital width greater; maxillary fenestrae slightly larger; palatal bridge markedly narrower (antero-posteriorly); palatine vacuities longer; tympanic bullae larger, being markedly longer.

Topotypes of *O. p. barnesi* differ from those of *O. p. figginsii* as follows: *Size*: Larger. *Color*: Sides and upper parts buffy moderately suffused with brown as opposed to cinnamon buffy heavily washed with dark brown. *Skull*: Slightly larger; nasals more inflated anteriorly; alveolar length of maxillary teeth greater; anterior margin of palatal bridge straight as opposed to markedly concave; occipito-sphenoidal suture straight as opposed to V-shaped.

Comparisons of topotypes of *O. p. saxatilis* with those of *O. p. barnesi* show the latter to differ as follows: *Size*: Larger. *Color*: Darker (general appearance browner); sides and upper parts Pinkish Buff moderately suffused with brown as opposed to Light Buff lightly suffused with brown. *Skull*: Larger in most measurements; posterior ends of nasals wider; maxillary fenestrae larger; posterior part of skull from lateral view slopes less sharply ventrad; anterior margin of palatal bridge square as opposed to concave; basioccipital wider; tympanic bullae larger and more inflated; rostrum deeper dorso-ventrally.

From topotypes of *O. p. lasalensis* those of *O. p. barnesi* can be distinguished as follows: *Size*: Larger. *Color*: Slightly darker; sides and

upper parts with more suffusion of brown; subauricular region more cinnamon. *Skull*: Larger in most measurements; nasals more inflated anteriorly; posterior ends of nasals wider; orbit longer; upper incisors longer; maxillary fenestrae larger; palatal bridge narrower; basioccipital markedly wider and longer.

Comparisons of topotypes of *O. p. barnesi* with topotypes of *O. p. wasatchensis* show the former to differ as follows: *Size*: Larger. *Color*: Darker (suffusion of brown greater); sides and upper parts Pinkish Buff as opposed to Light Ochraceous-Buff. *Skull*: Larger in nearly all measurements; nasals markedly more inflated anteriorly as opposed to relatively straight; frontal tongues of premaxillae longer; incisors more procumbent; maxillary fenestrae longer; upper disastema longer; anterior margin of palatal bridge straight as opposed to concave; basioccipital wider.

Topotypes of *O. p. barnesi* differ from topotypes of *O. p. clamosa* as follows: *Size*: Larger. *Color*: Differs from *O. p. clamosa* in much the same way that it does from *O. p. uinta*. *Skull*: Larger in nearly all measurements; nasals longer and markedly more inflated anteriorly; incisors longer; orbit longer; maxillary fenestrae markedly longer; tympanic bullae relatively less inflated ventrally; interpterygoid space markedly longer; palatal bridge wider (antero-posteriorly).

The name *Ochotona princeps barnesi* is in recognition of Claude T. Barnes, dean of Utah mammalogists whose writings first focused attention upon the mammalian fauna of Utah.

Specimens examined.—Total, 23, distributed as follows: *Sevier County*: 1 mi. NW Mt. Marvine (Seven Mile Valley), 9,200 ft., 6; Seven Mile Canyon 4 mi N Johnson's Res., 8,800 ft., 2; Johnson's Res., 8,800 ft., 15

As a result of this study, the pikas of Utah are now arranged in eight subspecies of *Ochotona princeps*. In Utah, these animals are restricted to talus slopes in high mountains. Our studies have led us to conclude that in addition to talus another important ecological requirement is moisture. We have never obtained animals from dry talus. This causes for a lack of occurrence of pikas in all talus slopes in any given mountain range. The majority of the mountains of Utah are isolated from each other by intervening valleys. These two ecological factors of talus and moisture in addition to the isolation of the mountains have caused for complete isolation of these animals.

In spite of this complete isolation of the populations of pikas, the evidence as presented by color and cranial details have enabled us to recognize complexes of relationship of the several subspecies. *Ochotona princeps saxatilis*, a Coloradan subspecies has its closest affinities with *O. p. lasalensis* from the La Sal Mountains of Utah, and not with *O. p. figginsii* of the western mountains of Colorado. *Ochotona princeps figginsii*, *O. p. uinta*, from the Uinta Mountains, *O. p. barnesi* from the Fishlake Mountains, and *O. p. utahensis* from the Aquarius Plateau constitute another complex of related subspecies. The Wasatch Mountains are inhabited by another complex consisting of *O. p. clamosa* from the northern area and *O. p. wasatchensis* from the southern area. The latter two subspecies are from the same ancestral stock, and are distinct from the subspecies which occur in the eastern plateaus of Utah.

This closer relationship of the pikas from the high plateaus of eastern Utah with those from the Rocky Mountains of Colorado than with those from the Wasatch Mountains is in agreement with that known to exist in other species of mammals.

The animals of *O. p. moorei* from the Wasatch Plateau in central Utah merit special consideration. While being distinct in color they do resemble *O. p. wasatchensis*. Cranially, they are distinct but do show some relationship with *O. p. barnesi* of the eastern complex. Past physiography indicates that there was opportunity for pikas from both the Wasatch Mountains and the eastern plateaus to attain the Wasatch Plateau. Animals now referable to *O. p. moorei* probably originated from an intergrading population of ancestral types of both complexes which became subsequently isolated. This is more than mere conjecture because it is known that intergradation between other kinds of mammals occurs at present on the Wasatch Plateau. Red squirrels, *Tamiasciurus hudsonicus fremonti* from Colorado and eastern Utah, and those of *T. h. ventorum* of the Wasatch Mountains intergrade on the Wasatch Plateau. Likewise, golden-mantled ground squirrels (*Citellus lateralis*) show this same phenomenon. Members of these two latter genera are not so restricted ecologically as are pikas which may account for the latter evolving into a distinct subspecies on the Wasatch Plateau while the squirrels still form intergrading populations there.

Pikas of the subspecies *O. p. cinnamomea* from the Beaver Mountains and those of *O. p. fuscipes* from Iron Mountain form another complex and are related to the subspecies *O. p. tutelata* from central Nevada. Both Howell (N. Amer. Fauna, 47, p. 46, August 21, 1924) and Hall (Mammals of Nevada, p. 59, Univ. California Press, July 1, 1946) remarked upon the relationship between *O. p. cinnamomea* and animals from central Nevada now known as *O. p. tutelata*. Geographically, the range of *O. p. fuscipes* is adjacent to that of *O. p. cinnamomea*, and although they are in the same complex, the former is more unlike the latter than the latter is from animals from central Nevada. Animals of *O. p. fuscipes* show some characters of the pikas from eastern Utah. This would suggest some gene exchange in the not too distant past between animals from the eastern complex and those that came into Utah from the west.

Geologists mostly agree that the mountains of Utah, where these subspecies of pikas occur are relatively young. The great uplifts that formed the major mountains and plateaus of Utah are no older than late Pliocene. Moreover, many of the uplifts are considered to have originated during the Pleistocene, and some even in the Late Pleistocene. In view of the youth of these mountains, the degree and amount of morphological differentiation between animals of the several subspecies of pikas indicate that subspeciation has been relatively rapid in this animal. These rapid uplifts would cause an increase in talus and followed by the aridity of the Late Pleistocene would effectively form isolated populations of pikas on the several mountains. Sufficient time has elapsed for them to have become subspecifically distinct.

Contribution from Department of Zoology, University of Utah, Salt Lake City, Utah.

TABLE I
MEASUREMENTS OF OCHOTONA

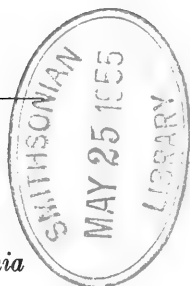
Total length	Length of hind foot	Length of ear	Occliptonasal length	Basilar length	Zygomatic breadth	Length of nasals	Length of orbit	Length of basioccipital	Width of palatal bridge	Length of maxillary fenestrae	Alveolar length maxillary tooth-row
<i>O. p. wasatchensis</i> 4 ♂ type, 3 near topotypes											
Average	188.8	32.0	23.3	42.9	34.1	20.9	14.7	10.0	8.4	2.0	4.8
Minimum	181	31	23	42.2	33.5	20.3	13.9	9.6	8.4	1.9	4.4
Maximum	197	33	25	43.7	34.6	21.5	15.1	10.5	8.4	2.0	5.1
<i>O. p. lasalensis</i> 3 ♂ type, 2 topotypes											
Average	178.7	31.0	23.0	44.4	35.0	22.6	15.3	10.0	8.5	2.5	5.6
Minimum	178	30	22	43.5	-----	22.5	15.1	9.7	8.5	2.2	5.3
Maximum	180	32	24	45.4	-----	22.7	15.5	10.2	8.5	2.8	5.8
<i>O. p. barnesi</i> 3 ♂ type, 2 topotypes											
Average	210.7	32.5	25	46.9	37.5	22.7	15.8	10.7	9.5	2.2	6.1
Minimum	210	32	24	46.6	37.0	22.0	15.5	10.2	9.3	2.2	6.0
Maximum	212	33	25	47.5	38.1	23.2	16.1	11.1	9.8	2.2	6.1
<i>O. p. wasatchensis</i> 8 ♀ type, 2 topotypes											
Average	187.6	31.5	25.1	43.9	34.3	21.0	14.9	10.2	8.5	2.1	4.8
Minimum	180	30	23	42.0	32.8	20.3	14.1	9.7	8.1	1.7	4.2
Maximum	198	34	26	45.5	36.6	21.6	15.9	10.5	9.1	2.5	5.1
<i>O. p. lasalensis</i> 3 ♀ type, 2 topotypes											
Average	190.3	30	23	43.2	34.1	21.9	15.0	9.9	8.4	2.5	5.2
Minimum	182	30	22	-----	33.4	21.5	14.6	9.6	8.0	2.2	5.0
Maximum	200	30	24	-----	34.8	22.2	15.3	10.1	8.8	2.9	5.6
<i>O. p. barnesi</i> 6 ♀ type, 2 topotypes											
Average	202.5	30.0	22.5	44.3	35.0	21.6	14.7	10.1	8.8	2.2	5.9
Minimum	200	28	20	43.6	33.6	20.9	14.1	9.7	8.3	2.0	5.5
Maximum	205	32	24	45.1	36.3	22.1	15.3	10.3	9.1	2.3	6.2

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF NEW COLUBRID SNAKES,
GENUS *ATRACTUS*, FROM ECUADOR

BY JAY M. SAVAGE

Natural History Museum, Stanford University, California



During the past few years I have been engaged in a revisional study of the Ecuadorian snakes of the genus *Atractus* Wagler, 1828. This analysis, based on an examination of approximately 350 examples about 250 of which were from Ecuador, is now near completion but as publication may be delayed it seems advisable to present preliminary diagnoses of the new forms. Acknowledgments for aid and material and a detailed discussion of the species and their affinities are reserved for the larger work.

The five species described in this paper belong to the *trilineatus* group of the genus. The group is characterized by non-capitate hemipenes, long loreal, small rostral, small internasals and large prefrontals. Forms having either 15 or 17 rows of dorsal scales occur in this section of *Atractus* but it seems likely that the forms with 15 scale rows have been derived from species with 17 rows. The color pattern of *trilineatus* and its allies is primitively of dark longitudinal stripes on a lighter ground color but many populations exhibit a tendency toward melanism and the color of these forms is of nearly uniform dark brown, gray or black. The species group has a wide range in South America and at least 25 names have been applied to members of the stock. Only two of these names appear to be applicable to Ecuadorian striped *Atractus*.

Since all the new forms described here are representatives of the *trilineatus* complex certain of them may eventually prove to be subspecifically allied either to one another or to extra-limital forms. Available information, especially regarding non-Ecuadorian *Atractus*, does not permit adequate exploration of this possibility and it seems best under the circumstances to regard each distinct population as a separate species.

Since the snakes described below are the only striped members of the *trilineatus* group besides *Atractus duboisi* Boulenger, 1880 and *Atractus collaris* Peracca, 1897, known from Ecuador, a provisional key for the identification of Ecuadorian members of this section is presented at the end of the paper.

Throughout this report where more than one specimen is at hand counts and measurements are given as follows: 1-2-3 (2.5). In this style of notation the figure in parentheses is from the holotype, the first figure indicates the lower limit of the variational range in the paratypes, the second number the arithmetic mean of the paratype series and the

third figure the upper limit of the range of variation in the paratypes.

Abbreviations represent the following collections: American Museum of Natural History (AM); British Museum of Natural History (BM); Chicago Natural History Museum (CM); Escuela Politecnica Nacional, Ecuador (EP); Museum National d'Histoire Naturelle, Paris (PM); Museum of Zoology, University of Michigan (UM); Natural History Museum, Stanford University (SU).

***Atractus gaigeae*, new species**

Rhabdosoma maculatum Bocourt, 1883 (part), p. 540, pl. 35 fig. 1.

Atractus bocourti Boulenger, 1894 (part), p. 306.

Holotype: UM 82887, a male from Santiago-Zamora Province, Ecua-

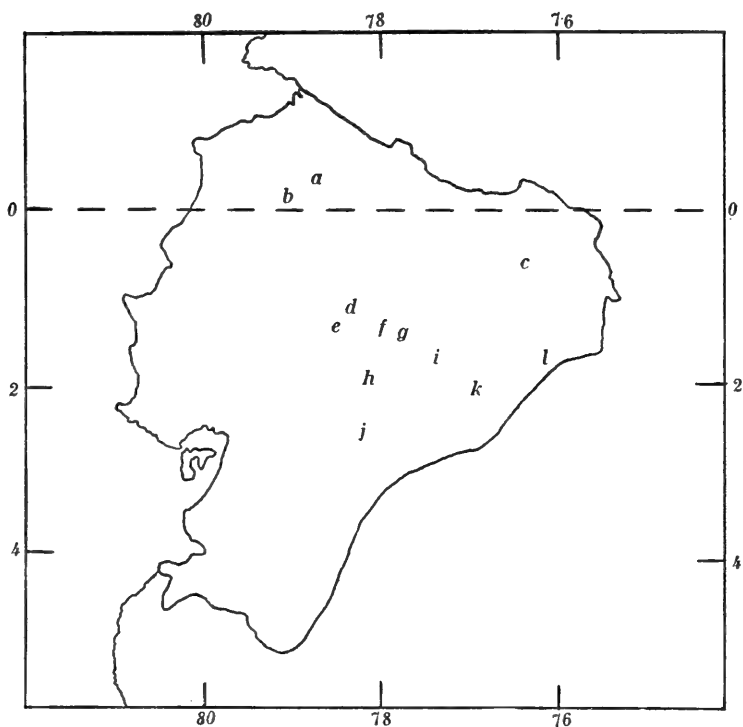


Fig. 1. Map of Ecuador showing position of localities mentioned in text. a. Intac, b. Mindó, c. Loreto, d. Llanganate, e. Baños, f. headwaters of Río Bobonaza, g. Canelos, h. Paitanga, i. Sarayacu, j. Sucua, k. Chicerota, l. Río Cononaco.

dor. Collected in the summer of 1935 by Clarence Altenberg and Bancroft G. Butler.

Paratypes: Also available are six paratypes from Napo-Pastaza Prov-

ince, Ecuador: between Baños and Canelos (AM 35891, a male); headwaters of the Río Bobonaza (SU 15621, a male); Canelos (SU 15619, a female and SU 15620, a male); Sarayacu (EP 48, a male); Chichero (EP 46, a female).

Diagnosis: A form most closely resembling *A. collaris* Peracca, 1897, of Peru and Ecuador and the Ecuadorian forms *A. ecuadorensis*, *A. occidentalis* and *A. dunni* described in this paper, but distinguished from these forms and other members of the genus in Ecuador by: 1) dorsal scales in 17 rows; 2) loreal between two and three times as long as postnasal; 3) teeth on maxillary 5-6; 4) ventrals in males 189-191-198 (192), in females 207-210-213; 5) pattern of seven dark stripes and two rows of regularly arranged dark spots.

Lepidosis: Rostral smaller than a prefrontal, pentagonal. Internasals much less than half as large as prefrontals; a little broader than long. Prefrontals longer than broad. Postoculars two. Temporals 1+2. Supralabials seven, third and fourth in eye. Infralabials six, usually three (rarely four) meeting a chin shield on each side. Caudals in males 35-37-39 (37), in females 25-26-27. Ventrals plus caudals 222-228.5-240 (236).

Hemipenes: Organ bifurcate at tip, covered with spines for complete length; largest spines in region of sulcus division, decreasing in size distally and proximally. Several small basal plicae mounted with minute hooked spines. A well-developed lateral fold or pocket extending from plicate area to level of fourth or fifth caudal, naked. This pocket lies opposite the sulcus spermaticus. Sulcus divided at seventh caudal. Hemipenes reaching to level of 11th or 12th caudal.

Coloration: Dorsal ground color brown and imposed upon it are seven dark longitudinal lines or stripes: a vertebral stripe, a single scale row wide; a pair of lateral stripes on the lower half of third and upper half of second scale rows; a pair of ventral stripes on upper edges of ventrals and lower half of first scale row; and between the ventral and lateral stripes on each side, restricted to the upper margin of the first and lower edge of second scale rows, an irregular lateroventral stripe. Between the vertebral and lateral stripes are a series of regularly arranged obscure dark dorsolateral blotches. A dark brown area on neck continuous with lateral brown stripes, bordering the posterior edge of the light nuchal collar. The collar is formed by the light throat color which extends upward on the neck as two narrow arms involving the tips of the parietals but not meeting on the mid-line. Top of head dark except for light spots on anterior part of prefrontals, internasals and in temporal region. Other head scales mainly brown but lower portions of rostral, nasals, loreals and supralabials frequently light. Throat and chin light with some brown markings on mental, chin shields and infralabials. Belly immaculate, light (salmon in freshly preserved material). Underside of tail and anal plate light, the former area with a few median brown spots.

Measurements in millimeters: Standard length (snout to anus) in males 197-225.5-251 (225), in females 280-296-312; tail length in males 23.5-28.6-34 (32), in females 22-24-26; head length (snout to tip of parietals) 6-6.4-7 (7.5); head width 3.5-4-4.5 (4).

Remarks: This species was originally described by Bocourt (1883,

p. 540) as part of his *Rhabdosoma maculatum*. His name was based on a female example in the Paris Museum with 144 ventrals, 20 caudals and the lateral stripes more or less broken into spots. Also included within *Rhabdosoma maculatum* by Bocourt was a specimen in the Berlin Museum, a male with 191 ventrals, 29 caudals and the pattern as described above for *gaigeae*. Both of Bocourt's specimens were from "Ecuador."

Boulenger (1894, p. 306, 308) placed *maculatum* in the genus *Atractus* making the name a secondary homonym of Günther's (1858, p. 204) *Isocelis maculata* of Brasil (also an *Atractus*). To further complicate matters Boulenger concluded that Bocourt's female specimen was an example of the eastern South American species *A. badius* and included the male snake from the Berlin Museum in his new species *Atractus bocourti* (type locality, Acomayo, Departament Huanuco, Peru). Neither of these allocations can be accepted on the basis of coloration, longitudinal counts and the hemipenes. Bocourt's first specimen (now PM 5986), which is herewith designated the lectotype of his *Rhabdosoma maculatum*, is a distinctive form completely unrelated to *A. badius*. The Berlin Museum snake is unquestionably identical with *A. gaigeae*.

On the basis of data kindly supplied by Mr. J. C. Battersby of the British Museum of Natural History, two males in the collections of that institution appear referable to *A. gaigeae*. One example (BM 80.12.12.8.13) from Canelos, Napo-Pastaza Province, Ecuador, has 190 ventrals and 36 caudals. The second specimen is from Paitanga, probably in eastern Chimborazo Province, Ecuador, and has 189 ventrals and 35 caudals. In other characters both specimens agree with the description presented above for *A. gaigeae*.

Within the *trilineatus* group *A. gaigeae* most closely resembles *A. collaris* Peracca, 1897 (type locality, Rio Cononaco, Napo-Pastaza Province, Ecuador) in coloration but *collaris* lacks a vertebral stripe and has fewer ventrals, 163 in the male holotype and 175 in a female (SU 12482) from Pevas, Loreto Territory, Peru. The other forms most like *gaigeae* in color pattern differ in the number of longitudinal stripes and series of dorsolateral blotches as well as in having fewer ventrals.

The new species is named in honor of Mrs. Helen Thompson Gaige, long associated with the Museum of Zoology, University of Michigan, who was interested in Ecuadorian members of the genus *Atractus* and surrendered her prior claim so that I might prepare a revisional study.

Atractus dunni, new species

Rhabdosoma maculatum Bocourt, 1883, p. 539, pl. 34, fig. 2 (type locality, Ecuador), a secondary homonym of *Atractus maculatus* (Günther, 1858).

Holotype: PM 5986, a female.

Diagnosis: A species closely related to *A. gaigeae* but distinguished from that form and other Ecuadorian *Atractus* as follows: 1) dorsal scales in 17 rows; 2) loreal between two and three times as long as postnasal; 3) maxillary teeth not known but probably less than 9 in number; 4) ventrals in female lectotype 144, probably about 10 less in males; 5) pattern of five longitudinal stripes and two series of spots.

Lepidosis: Rostral smaller than a prefrontal. Internasals much less

than half as large as a prefrontal. Prefrontals longer than broad. Postoculars two. Temporals 1+2. Supralabials seven, third and fourth in eye. Infralabials five, three meeting a chin shield on each side. Caudals 20. Ventrals plus caudals 164.

Coloration: Dorsal ground color brown with a vertebral dark stripe, two lateral dark stripes, a pair of ventral stripes and a series of dorsolateral dark blotches on each side. Lateral stripes partially broken into discrete spots. A light nuchal collar which does not completely incircle neck, bordered posteriorly by a dark area which is continuous with the lateral stripes. Head mainly brown. Throat, belly, anal plate and underside of tail light.

Measurements in millimeters: Standard length 305; tail length 34.

Remarks: This is a new name for *Rhabdosoma maculatum* Bocourt, 1883, which is preoccupied in *Atractus* by *Isocelis maculata* Günther, 1858. The above description is derived from Bocourt's original account and plate and information kindly provided by M. Jean Guibé of the Paris Museum.

The species is named for Dr. Emmett Reid Dunn of Haverford College at whose suggestion a review of Ecuadorian *Atractus* was undertaken.

Atractus ecuadorensis, new species

Holotype: CM 23529, a male from "Llangate area," Ecuador (probably refers to the Llanganate Range of eastern Tungurahua Province). Collected in March of 1936 by R. W. Chadwick.

Diagnosis: A form similar to *A. dunni* and *A. occidentalis* but differing from them both in coloration and ventral counts. Distinct from all Ecuadorian *Atractus* in: 1) dorsal scales in 17 rows; 2) loreal between two and three times as long as a postnasal; 3) maxillary teeth 8; 4) ventrals in male holotype 144, should be about 10 higher in females; 5) pattern composed of six longitudinal stripes which may be more or less interrupted.

Lepidosis: Rostral smaller than a prefrontal. Internasals much less than half as large as prefrontals. Prefrontals longer than broad. Postoculars two. Temporals 1+2. Supralabials seven, third and fourth in eye. Infralabials five, three meeting each chin shield. Caudals 41. Ventrals plus caudals 185.

Hemipenes: The tail of the type is in poor condition and an accurate description of the penial structures is not possible. The organ appears to be essentially similar to that of *A. gaigeae* and extends to the level of the 12th caudal.

Coloration: Ground color a light brown upon which are superimposed a pair of dorsolateral dark stripes (homologous to the dorsolateral blotches in *A. gaigeae* and *A. dunni*) on the fifth and sixth or sixth and seventh scale rows; a pair of lateral stripes on the third and fourth scale rows; and a third stripe on each side (lateroventral), most prominent anteriorly, running along the margins of the first and second scale rows. All these stripes except the last frequently interrupted and discontinuous. No vertebral or ventral stripes. Dark postnuchal collar area connects the dorsolateral and lateral stripes. Nuchal collar light, reduced, hardly involving tips of parietals. Head dark brown except for light areas on supralabials. Throat and chin light, mental, chin shields and

infralabials heavily mottled with brown. Belly and underside of tail light, with a sprinkling of brown marks which are most concentrated posteriorly.

Measurements in millimeters: Standard length 198; tail length 48; head length 8; head width 4.

Remarks: This form is quite similar to *A. occidentalis* its cognate from western Ecuador. The two forms are unique among the 17 scale rowed Ecuadorian members of the *trilineatus* group in lacking ventral stripes. In addition to differences in ventrals, maxillary dentition and hemipenial features *A. ecuadorensis* is distinct from *A. occidentalis* in lacking a vertebral dark stripe.

Ecuadorensis resembles to a lesser extent *A. dunni*. The two agree closely, when due allowance is made for the sex of the types, in scutellation but the coloration is very different and it is doubtful that the two forms will prove to be identical.

Atractus occidentalis, new species

Holotype: BM 1916.5.23.5, a male from Mindo, Pichincha Province, Ecuador, collected by W. Goodfellow.

Diagnosis: A form showing closest similarity in coloration to *A. ecuadorensis* and in scutellation to *A. dunni* but differing from them and other *Atractus* from Ecuador in: 1) dorsal scales in 17 rows; 2) loreal between two and three times as long as postnasal; 3) maxillary teeth 6; 4) ventrals in male holotype 153; 5) pattern of six irregular longitudinal stripes.

Lepidosis: Rostral smaller than a prefrontal, roughly pentagonal. Internasals much less than half as large as prefrontals; about as broad as long. Prefrontals longer than broad. Postoculars 2-3. Temporals 1+2. Supralabials seven, third and fourth in eye. Infralabials six, four contacting chin shields on each side. Caudals 39. Ventrals plus caudals 192.

Hemipenes: Bifurcate, covered with large spines medially and with very small spines at tip and base. Basal plicae with small hooked spines. Lateral fold or pocket reaching level of fourth caudal, naked. This pocket opposite the sulcus spermaticus which divides at seventh caudal. Hemipenes reaching 18th caudal.

Coloration: Dorsal ground color brown with six irregular longitudinal stripes of darker brown disposed upon it as follows: a pair of lateral stripes on portions of third and fourth or fourth and fifth scale rows; a pair of lateroventral stripes on parts of first and second scale rows; and a dorsolateral pair of stripes corresponding to the dorsolateral blotches of *A. gaigeae* on the sixth and seventh scale rows. No definite ventral stripes although dark markings at tips of ventrals. The light collar on neck not sharply demarcated posteriorly by a dark area, suffused with brown pigment, the two lateral arms narrowly separated by darker brown medially and enveloping posterior-lateral portion of parietals. Top of head dark brown, sides lighter except for dark line through eye along upper edges of supralabials. Lower half of supralabials light; throat and chin light with brown spots on anterior infralabials, chin shields and mental. Belly light anteriorly, clouded with dark brown markings most concentrated laterally. At level of about 110th ventral

the clouding comes to overlie most of the venter. Anal brown. Under-sides of tail dark brown with a few light punctations.

Measurements in millimeters: Standard length 265; tail length 56; length of head 9; width of head 5.

Remarks: *A. occidentalis* appears to be the west Ecuador representative of *A. ecuadorensis* which it resembles in coloration. The new form is well distinguished from *ecuadorensis* by the number of maxillary teeth, ventrals and the hemipenes.

The name *occidentalis* is from Latin meaning western and seems appropriate for an *Atractus* from the west slope of the Ecuadorian Andes.

Atractus orcesi, new species

Holotype: SU 15622, a male from Loreto, Napo-Pastaza Province, Ecuador. Collected in October of 1952 by J. Olalla.

Diagnosis: A species obviously allied to *A. duboisi* Boulenger, 1880, but also showing some affinity with east Ecuadorian 17 scale rowed forms. Well distinguished within the genus in: 1) dorsal scales in 15 rows; 2) loreal between two and three times as long as postnasal; 3) teeth on maxillary 7; 4) ventrals in male type 153, probably about 10 higher in females; 5) pattern of five longitudinal stripes on back and a broad mid-ventral dark stripe.

Lepidosis: Rostral smaller than a prefrontal, almost triangular. Internasals much less than half as large as prefrontal; a little broader than long. Prefrontals longer than broad. Postoculars two. Temporals 1+2. Supralabials seven, third and fourth in eye. Infralabials six, three meeting a chin shield on each side. Caudals 32. Ventrals plus caudals 185.

Hemipenes: Bifurcate at tip, covered with moderate spines of almost uniform size. Basal plicae small, surmounted by spines which gradually blend into spines on body of organ. Lateral fold or naked pocket opposite sulcus spermaticus, extending to fifth caudal. Sulcus divided at seventh caudal. Hemipenes reaching to level of 12th caudal.

Coloration: Dorsal ground color brown with a series of dark longitudinal stripes: a single irregular mid-dorsal stripe, a pair of lateral stripes on upper half of second and lower portion of third scale rows and a pair of ventral stripes on tips of ventrals and lower edges of first scale row. A broad light color on neck, demarcated by light and dark brown areas posteriorly. One dark area continuous with lateral stripes. Light collar complete, not divided by brown mid-dorsally, occupying most of parietals. Upper and lateral head shields dark brown with a few scattered light flecks, except for lower two-thirds of supralabials which are light. A more or less prominent postocular stripe from postoculars to last supralabial. Chin and throat light except for some brownish areas. Belly light with a broad median dark stripe running the length of the body and two ventral stripes along edges of ventrals. On some ventral scutes brown mottling connects the mid-ventral stripe with the ventral stripes along edges of the ventral plates. Anal plate dark brown with light posterior margin. Underside of tail almost uniform brown with a few light flecks.

Measurements in millimeters: Standard length 269; tail length 38.5; head length 8; head width 4.

Remarks: This form is very close to *A. duboisi* Boulenger, 1880, originally described from the Andes of Ecuador on the basis of a male with 150 ventrals and 32 caudals. A second specimen of *duboisi* (EP 611) from Sucua, Santiago-Zamora Province, Ecuador, is a female with 157 ventrals and 18 caudals. The specimen from Intac, Imbabura Province, Ecuador, on the western slopes of the Andes referred by Boulenger (1894, p. 310) to *duboisi* is a young female with 172 ventrals and 16 caudals and obviously cannot be allocated with either *duboisi* or *orcesi* both east Ecuadorian forms. The Intac specimen probably represents an undescribed species of the *trilineatus* group.

A. orcesi appears to be the lowland cognate of *A. duboisi* of the east Andian slopes. The two forms are distinguished by differences in ventral counts, number of maxillary teeth, number of infralabials in contact with the chin shields and number of supralabials. In addition *A. orcesi* retains a vertebral dark stripe and a pair of lateral stripes which are lacking in *duboisi*. The dark mid-ventral stripe is also broader in *orcesi* than in the montane form. Although most of these differences are trivial and subject to some variation in other *Atractus* populations and while few examples are available, it still seems worthwhile to distinguish between the two forms. The distributional pattern with *orcesi* in the lowlands and *duboisi* at higher altitudes further justifies the concept of two distinct forms.

In the type of hemipenes *orcesi* is similar to *A. occipitoalbus* Jan, 1862, a uniformly black, 15 scale rowed form from eastern Ecuador. It is quite possible that these forms are related but *occipitoalbus* has a lower ventral count and is a slimmer snake than *orcesi* or *dubosi*. *A. occipitoalbus* and *A. orcesi* occur together at the type locality of the latter species. Superficially *A. ecuadorensis*, a 17 scale rowed species, resembles *A. orcesi* and *A. duboisi* and it may be that the 15 scale rowed forms are derived from *ecuadorensis* or some other of the striped, species having 17 scale rows. The relationship does not appear to be particularly close between *orcesi* and any other *Atractus* except *duboisi*.

This species is named for Dr. Gustavo Orcés V. of the Escuela Politécnica Nacional, Ecuador, through whose efforts many Ecuadorian amphibians and reptiles have been added to the collections of the Natural History Museum of Stanford University and who presented the type specimen of the new species to us.

A KEY TO THE STRIPED MEMBERS OF THE *ATRACTUS TRI-LINEATUS* GROUP KNOWN FROM ECUADOR.

- 1a. Dorsal scales in 17 rows.
 - 2a. Ventrals plus caudals less than 210 (range 164-196).
 - 3a. No ventral longitudinal stripes or dorsolateral blotches, although dorsolateral stripes present.
 - 4a. No vertebral stripe; maxillary teeth 8; hemipenes in males extending to level of 12th caudal.....*A. ecuadorensis*.
 - 4b. A vertebral stripe; maxillary teeth 6; hemipenes in males extending to level of 18th caudal.....*A. occidentalis*.
 - 3b. Ventral longitudinal stripes and dorsolateral blotches present.
 - 5a. A vertebral stripe present; ventrals plus caudals 164.....*A. dunni*.
 - 5b. No ventral stripe; ventrals plus caudals 194-196.....*A. collaris*.

- 2b. Ventrals plus caudals 210 or more (range 222-240).....*A. gaigeae*.
 1b. Dorsal scales in 15 rows.
 6a. No vertebral or lateral stripes; ventrals plus caudals 175-182;
 supralabials 8; maxillary teeth 8; four infralabials meet a chin
 shield on each side.....*A. duboisi*.
 6b. Vertebral and lateral stripes present; ventrals plus caudals 185;
 supralabials 7; maxillary teeth 7; three infralabials contact a chin
 shield on each side.....*A. orcesi*.

LITERATURE CITED

- Bocourt, Marie-Firmin
 1883. Mission scientifique au Mexique et dans l'Amerique centrale.
 . . . Etudes sur les reptiles et les batraciens. Paris. 9:529-659,
 pls. 31-35.
 Boulenger, George Albert
 1894. Catalogue of the snakes in the British Museum (Natural His-
 tory). vol. 2. Taylor and Francis, London: xi-328, 20 pls.
 Günther, Albert Carl Ludwig Gotthilf
 1858. Catalogue of colubrine snakes in the collection of the British
 Museum. London: xvi-281.
 Peracca, Mario Giacinto
 1897. Intorno ad una piccola raccolta di rettili di Cononacco (Peru
 orientale). Bol. Mus. Zool. ed Anat. R. Univ. Torino, 12:1-7, 1
 text-fig.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW RECORDS AND DESCRIPTIONS OF
POLYDESMOID MILLIPEDS (ORDER POLYDESMIDA)
FROM THE EASTERN UNITED STATES

BY NELL B. CAUSEY
Fayetteville, Arkansas



Holotypes of the species described here will be deposited in the permanent collection of the American Museum of Natural History. Paratypes and other specimens, except those from Kentucky, are in the collection of the author. The Kentucky specimens were collected chiefly by the late Prof. Harrison Garman and are the property of the Department of Entomology and Botany, University of Kentucky. All specimens for which no collectors are mentioned were taken by the author with the assistance of Dr. David Causey.

Family Polydesmidae
Genus *Pseudopolydesmus* Attems 1898
Pseudopolydesmus minor (Bollman)

Polydesmus minor Bollman, 1888. Ent. Amer. 4:2 (Little Rock, Pulaski Co., Arkansas).

Pseudopolydesmus minor, Chamberlin, 1942. Bull. U. Utah, biol. ser. 6(8):19, fig. 32.

Record: *Arkansas*, Desha Co., McGehee, numerous specimens under logs on a burnt over area, Jan. 7, 1954.

Pseudopolydesmus pinetorum (Bollman)

Polydesmus pinetorum Bollman, 1888, Ent. Amer. 4:2-3 (Little Rock, Pulaski Co., Arkansas).

Pseudopolydesmus pinetorum, Causey, 1952, Nat. Hist. Misc. 106:6, fig. 5.

Records: *Arkansas*: Dallas Co., Princeton, Jan. 7, 1954. *Kansas*: Riley Co., Apr. 2, 1952, L. O. Warren. *Kentucky*: Jefferson Co., Louisville, Apr. 4, 1922, F. E. Merriman, "ground just covered with these;" Fayette Co., Lexington, Mar. 17, 1922, Arthur Stone.

Pseudopolydesmus serratus (Say)

Polydesmus serratus Say, 1821, Jour. Philadelphia Acad. Sci. 2:106-107.

Pseudopolydesmus serratus, Causey, 1952, Nat. Hist. Misc., 106:6.

Records: *Kentucky*: Anderson Co., Tyrone; Carstian Co., Hopkins-

MAY 20 1955

ville; Fayette Co., Lexington, H. Garman; Fulton Co., Hickman, collector unknown. *Mississippi*: Lincoln Co., 12 miles east of Brookhaven, Dec. 25, 1953.

Genus *Scytonotus* C. L. Koch 1847

Scytonotus granulatus (Say)

Polydesmus granulatus Say, 1821, Jour. Philadelphia Acad. Sci. 2: 107 (Pennsylvania).

Scytonotus granulatus, Cook and Cook, 1895, Ann. New York Acad. Sci. 8(5):238-246, figs. 46-62.

Records: *Kentucky*: Fayette Co., Lexington, Apr. 9, 1892, Feb. 25, Mar. 2, 1895; Hopkins Co., Nortonville, Mar. 8, 1891, H. Garman.

Family Euryuridae Pocock

Euryuridae, Hoffman, 1951, Proc. U. S. Nat. Mus. 102(3300):235-243.

As a rule, the three genera of the Family Euryuridae that are known in the United States are most abundant in the states that border on the Mississippi and Ohio rivers. Species of *Auturus* tend to occur west of the Mississippi River, species of *Euryurus* east of it, while *Singulius* is known only from the type locality in Mississippi. Since the somatic characters are so close in these three genera, they are best separated by the gonopods of adult males, as in the following key:

- 1 (2) Tibio-tarsal region of gonopods much shorter than prefemoro-femoral region, the divisions of the bifid apex coarse and of uneven width *Auturus*
- 2 (1) Tibio-tarsal region almost as long as prefemoro-femoral region; if the apex is bifid the division are narrow and are of even width 3
- 3 (4) Apex of tibio-tarsus bifid *Euryurus*
- 4 (3) Apex of tibio-tarsus simple *Singulius*

Genus *Auturus* Chamberlin 1942

Auturus evides (Bollman)

Paradesmus evides Bollman, 1887, Ent. Amer. 2:229 (Winona, Winona Co., Minnesota).

Auturus evides, Chamberlin, 1942, Bull. U. Utah, biol. ser. 6(8):7.

Auturus florus Causey, 1950, Ent. News 61(2):37-38, figs. 1, 2.

Records: *Wisconsin*: Pierce Co., Maiden Rock, one male, one female; July 5, 1954, L. and H. W. Levi. *Missouri*: St. Louis Co.; one male, one female, larvae, Mar. 9, 1952, E. P. Meiners. *Illinois*: Vermillion Co., Oakwood, one male, May 1, 1943, A. H. Ross. *Arkansas*: Polk Co., Rich Mt., one male, three females, Apr. 25, 1953; Washington Co., Fayetteville, numerous specimens.

Auturus louisiana (Chamberlin)

Euryurus louisiana Chamberlin, 1918, Ann. Ent. Soc. Amer. 11:371 (Creston, Natchitoches Par., Louisiana).

Records: *Louisiana*, Natchitoches Par., Grand Ecure, Feb. 28, 1954, one male, J. E. Sublette. *Arkansas*: Clark Co., Arkadelphia, Apr. 15, 1953; Polk Co., Shady Lane Recreational Area, one male, one female, Herndon Dowling; Sevier Co., Wilton, Dec. 22, 1950, one male, one larva. Garland Co., Hot Springs, one male, May 10, 1951, Ruth Crozier.

***Auturus mcclurkini*, new species**

Figure 1

Diagnosis: Gonopods distinguished from those of all other species of the genus by the curvature in the prefemur-femur and the slightly longer tibio-tarsus.

Male holotype: Width 3.2 mm., length about 22 mm. Colors not developed. Details of the exoskeleton are typical of the genus. Anterior angles of segments two through 18 have the usual minute tooth, and the apex of the anal tergite is broad, with the lateral and caudal margins straight and the corners narrowly rounded. Gonopods also typical of the genus, but the bend in the prefemur-femur is unusual. *In situ* the basal halves of the telopodites are parallel; beyond the bend the direction is meso-ventrad, so they cross at about the end of the femur. Prefemur-femur incompletely setose, as shown in figure 1; tibio-tarsus is a bright amber color, contrasting with the pale yellow of the remainder of the telopodite.

Type locality: Tennessee, Jackson Co., Jackson, in rotting log, one male, Apr. 18, 1954, Irving McClurkin.

Genus *Euryurus* C. L. Koch 1847

Euryurus aculeatus (Causey)

Polydesmus erythropygus (Brandt), McNeill, 1887, Proc. U. S. Natl. Mus. 10:329, fig. 9.

Eutheatus aculeatus Causey, 1952, Nat. Hist. Misc. 106:9-10, fig. 8 (Giant City State Park, Madison Co., Illinois).

Records: *Kentucky*, Carstian Co., Hopkinsville, Nov. 1, 1890; Anderson Co., Tyrone, Apr. 23, July 14, 1892; Fayette Co., Lexington, May 5, 1890; Hopkins Co., Nortonville, Mar. 8, 1881; Powell Co., Natural Bridge, July 21, 1912; Jessamine Co., High Bridge, Jan. 8, 1892; all collected by H. Garman. *Indiana*, Monroe Co., Morgan-Monroe State Park, Oct. 20, 1953, B. G. Owen.

Genus ***Singulius***, new genus

Resembles *Euryurus* Attems 1938 in the elongated tibio-tarsal region of the male gonopods. Differs from that genus in that the apex of the telopodite is simple rather than bifid and in the absence of a protrusion at the junction of the prefemoro-femoral and tibio-tarsal regions. Apparently indistinguishable from both *Euryurus* and *Auturus* in somatic characters and in habitat, which is rotting wood.

Generotype: *Singulius mississippiensis*, new species.

***Singulius mississippiensis*, new species**

Figure 2

Male holotype: Width 4 mm., length 27 mm. Colors as in related genera, i. e., triangular areas on the keels and a medial, oval spot on the metazonites are red-orange, the remainder of the dorsum is olive-black, and the legs and venter are white. Other somatic characters are so typical it is doubtful whether any will be useful as diagnostic criteria.

In situ the telopodites of the gonopods are directed cephalad, but the tibio-tarsal region curves mesiad and lies contiguous and parallel with

its mate. As shown in figure 2, the prefemoro-femoral region is setose on the mesial and ventral surfaces, and the tibio-tarsal region is glabrous. There is no enlargement at the junction of these two regions, nor any irregularity in the curvature of the seminal canal there. The seminal canal opens at the apex. The coxae of the gonopods are connected by a short, flexible suture along the ventro-medial surface.

Type locality: Mississippi, Jackson Co., Van Cleave, in rotting log in mixed woods, two males, three larvae of 19 segments, Jan. 1, 1954.

Family Xystodesmidae
Genus *Cheiropus* Loomis 1944

Loomis regards this genus as being closely related to *Zinaria*; however, I find that the stouter body, the absence of sternal processes adjacent to the legs, and the spined coxae are indicative of a closer position to *Apheloria* and its allies than to *Zinaria*.

Cheiropus plancus Loomis

Cheiropus plancus Loomis, 1944, *Psyche* 51(3-4):171-172, fig. 3 (Thomasville, Thomas Co., Georgia).

Record: *Florida*, Leon Co., Tallahassee, 2202 Amelia Circle, one male, width 9 mm., one female, width 9.6 mm., Harold J. Humm, June 30, 1952.

The color is as follows: caudolateral two-thirds of keels, a wide band across the caudal margin of the metazonites, and a band completely around the collum are red-orange; remainder of dorsum black; head and antennae brown; venter and legs cream.

Genus *Epeloria* Chamberlin 1939
Epeloria bimaculata (McNeill)

Polydesmus bimaculatus McNeill, 1887, *Proc. U. S. Natl. Mus.* 10:323, pl. 11, figs. 3, 4, [?]5 (Pensacola, Escambia Co., Florida).

Spathoria bimaculata, Chamberlin, 1939, *Bull. U. Utah, biol. ser.*, 5(3):6.

Records: *Florida*, Escambia Co., Pensacola, Cantonment, Molino, under live oaks, Jan. 5, 1954, width of males 6.3-7.6 mm., width of females 6.8-7.4 mm. *Alabama*, Mobile Co., Grand Bay, Alabama Port, June 17, 1953; Spring Hill, Mar., Apr. 1954, mixed woods, width of males 6.3-8.3 mm., width of females 6.3-9 mm. *Mississippi*, Jackson Co., Pascagoula, June 16, 1953; Van Cleave, Jan. 1, 1954, mixed woods, width of males 7.6-7.8 mm., width of females 8.1-8.4 mm.

The populations from the several sites show slight variation in the following details of the gonopods: depth of cleft, width and curvature of both apical branches, abundance and length of setae, length of prefemoral branch. They fall into three geographical groups that may merit subspecific recognition when the genus is better known.

Epeloria fictus Chamberlin

Epeloria fictus Chamberlin, 1943, *Proc. Biol. Soc. Wash.* 56:37-38, fig. 11 (Thomasville, Thomas Co., Georgia).

Record: *Florida*, Leon Co., Tallahassee, June 1953, male, width 6.9 mm., female, width 8 mm., Harold J. Humm.

Genus *Pachydesmus* Cook 1896
Pachydesmus clarus (Chamberlin)

Fontaria clara Chamberlin, 1918, Ann. Ent. Soc. Amer. 11:372 (Creston, Natchitoches Par., Louisiana).

Pachydesmus clarus, Loomis and Hoffman, 1948, Proc. Biol. Soc. Wash. 61:53.

Records: *Louisiana*, Lincoln Par., Ruston, Feb. 15, 1952, W. J. Harman; *La Salle Par.*, Jena, Feb. 28, 1954, J. Stone.

The fully developed color is as follows: dorsum black-brown, keels coral, venter and legs pale yellow. Sternites and coxae unspined; metazonites coriaceous, prozonites smooth.

Genus *Apheloria* Chamberlin 1939
Apheloria adela Chamberlin

Apheloria adela Chamberlin, 1939, Bull. U. Utah, biol. ser., 5(3):10, pl. 4, fig. 34 (Ithaca, Tompkins Co., New York).

Record: *West Virginia*, Pendelton Co., Seneca Rocks, hardwood sawdust pile, Apr. 3, 1954, one male, width 9.8 mm., W. J. Harman.

The color is as follows: legs, keels, and narrow bands on margins of metazonites yellow, remainder of dorsum brown.

Apheloria pinicola Chamberlin

Apheloria pinicola Chamberlin, 1947, Proc. Acad. Natl. Sci. Phila. 99:26, figs. 6, 7 (Pine Mountain, Harlan Co., Kentucky).

Record: *Kentucky*, Bell Co., Pineville, June 15, 1892, H. Garman, two males, width 9.9 mm.

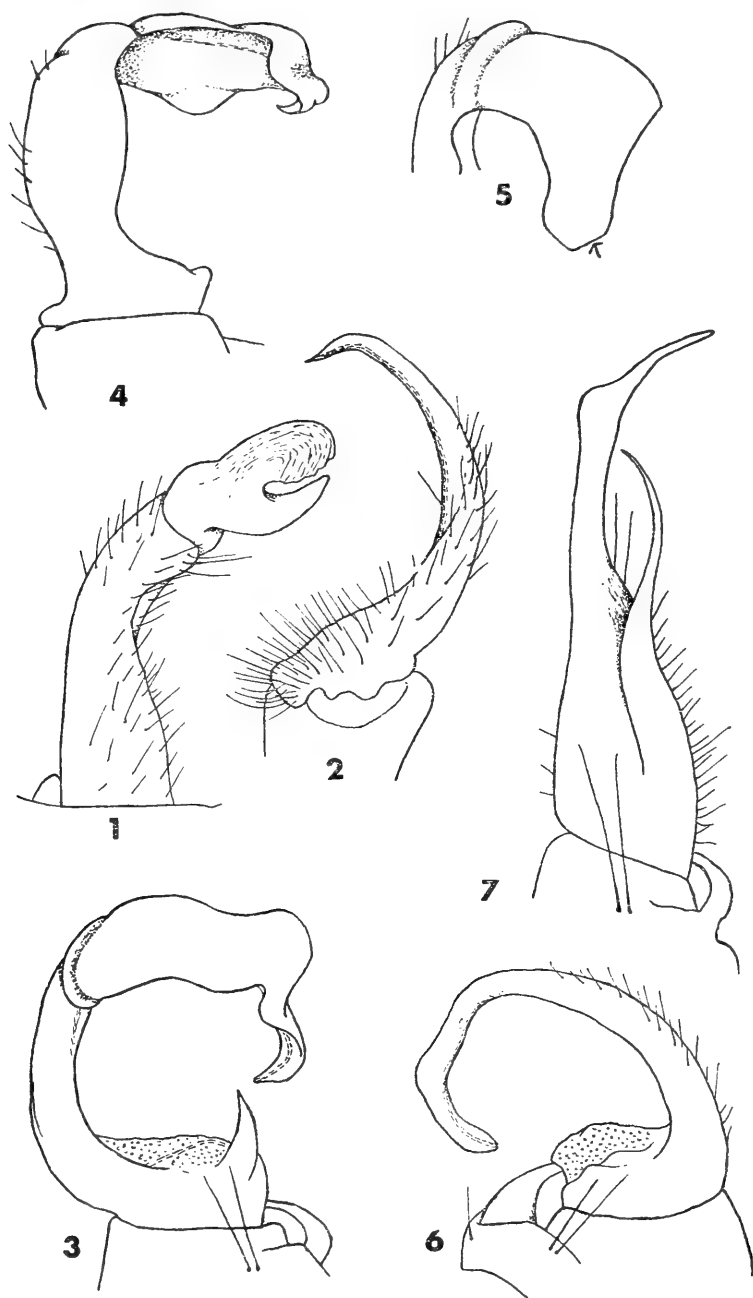
After long preservation and drying the dorsum is brown, and the entire keels and small, medial, oval areas on the metazonites are yellow; in one specimen the collum has four yellow spots, and in the other there are three. The gonopods of this species and of *A. reducta* Chamberlin, 1939, appear to be indistinguishable.

Genus *Brachoria* Chamberlin 1939
Brachoria electa, new species

Figure 3

Diagnosis: Gonopods closely resemble those of *B. etholeta* Chamberlin, 1942, but differ in being more massive and in having a right angle bend at about the middle of the region distad of the transverse furrow.

Male holotype: Width 9.6 mm. No traces of color remain. Keels wide, continuing the slope of the dorsum. Segments 6 through 14 of uniform width. Anterior margin of collum concentric; caudal margin almost straight; anterior margin with a marginal sulcus from the level of the eyes to the caudal margin. Keels of collum extend slightly ventrad of the keels of the second segment. Keels of segments 2 through 19 with a welt on the anterior and lateral margins; pores open dorsad through the welts. Anterior angles of all keels rounded, becoming more so on the posterior segments. Posterior angles of all anterior keels either slightly obtuse or right angles, with the apex narrowly rounded; beginning with segment 16 the posterior angles are acute, and the apex is narrowly rounded. Keels of segment 19 two-thirds as broad and long as those of



18. Anal tergite triangular, the apex narrow, truncated. Mesial margins of anal valves raised; anal scale broadly triangular. Sternites smooth, glabrous; sternites between legs 4, 5, and 6 each with a pair of low mounds; sternites of segments 8 through 17 produced in a ridge, sharp in the middle, between the second legs of each segment. Coxae of all legs behind the eighth with a short, stout spine. Second article of legs with the usual long spine.

Gonopods so broad and heavy they resemble species of *Tucoria*. *In situ* they are directed mesio-cephalad, crossing in the region of the transverse ridge. The narrowed apical region curves mesio-dorsal, so the apices of the two gonopods almost touch. A cephalic view is shown in figure 3. When viewed from below, the region of the telopodite proximad of the transverse ridge is seen to be sigmoidally curved.

Type locality: Kentucky, Anderson Co., Tyrone, one male, Apr. 28, 1892, H. Garman.

Brachoria ethotela Chamberlin

Brachoria ethotela Chamberlin, 1942, Bull. U. Utah, biol. ser. 6(8):5, pl. 2, fig. 13 (Marion, Smyth Co., Virginia).

Records: *Kentucky*, Fayette Co., Lexington, Oct. 1, 1894, one male, width 7 mm., under stones; July 16, 1894, one female, width 12 mm., H. Garman; June 21, 1920, one female, width 9 mm., H. H. Jewett. *Madison Co.*, Richmond road at Kentucky River, May 30, 1892, one male, width 8.3 mm., length about 38 mm. *Powell Co.*, Natural Bridge, May 5, 1895, one male, width 9.1 mm.; Oct. 21, 1911, one male, width 10.1 mm., H. Garman.

Genus *Tucoria* Chamberlin 1943

A key to the genus *Tucoria* was published by Hoffman (1948). The species described here is the fifth known for the genus, all from Kentucky. The closely related genus *Brachoria* is more widely distributed, with species from Maryland to Mississippi. The most reliable character by which to separate the two genera is the nature of the prefemoral process of the male gonopods. In all species of *Brachoria* this process is well developed, cylindrical, acute; while in *Tucoria* it is variable, either almost absent, peg-like, or triangular. In most species of *Brachoria* the

EXPLANATION OF FIGURES

Fig. 1. *Auturus mcclurkini*, new species. Caudal view of telopodite of right gonopod *in situ*.

Fig. 2. *Singulius mississippiensis*, new genus and species. Ventral view of left gonopod.

Fig. 3. *Brachoria electa*, new species. Cephalic view of telopodite of left gonopod.

Figs. 4, 5. *Tucoria calceata*, new species. 4. Lateral view of telopodite of left gonopod. 5. Anterior view of distal region of left gonopod.

Fig. 6. *Rudiloria mohicana*, new genus and species. Dorsal view of telopodite of right gonopod.

Fig. 7. *Cibularia profuga*, new species. Subdorsal view of telopodite of left gonopod.

region of the telopodite beyond the transverse ridge is narrow and elongated, but in some it approaches the width that is characteristic of *Tucoria* species.

***Tucoria calceata*, new species**

Figures 4 and 5

Diagnosis: Gonopods closely resemble those of *T. kentuckiana* (Causey, 1942), but are distinguished by the boot-like shape, as viewed from in front, of the region of the telopodite beyond the transverse ridge.

Male holotype: Width 10 mm. No traces of the color remain. Characteristics of the exoskeleton are as described above for *Brachoria electa*.

Gonopods heavy, with the usual transverse ridge and rather obscure apical piece (Fig. 4). *In situ* they are directed mesocephalad, so the mates cross twice, first just below the transverse ridge, and second at the apex. From an anterior view (Fig. 5) the region beyond the transverse ridge is roughly boot-shaped, and the small apical piece, which is attached at the point indicated by the arrow, is not visible. From a lateral view (Fig. 4) the apical process is easily visible and the slight, prefemoral protuberance can be seen.

Type locality: Kentucky, Anderson Co., Tyrone, one male, Apr. 28, 1892 H. Garman; in the same collection as the holotype of *Brachoria electa*.

Genus *Rudiloria*, new genus

Resembles *Apheloria* Chamberlin, 1939, in the spined coxae, the absence of sternal processes, and in the long, curved telopodite of the male gonopods. Differs from that genus in the smaller body size and especially in the absence of a prefemoral spur or process on the telopodite of the male gonopods. Other generic characters are given in the description of the generotype, *R. mohicana*, new species.

Fontaria oblonga Koch, 1847, from Pennsylvania is tentatively referred to this genus.

***Rudiloria mohicana*, new species**

Figure 6

Male holotype: Width 6 mm., length about 27 mm. After two years in alcohol the colors are as follows: legs and venter yellow-tan; head, antennae, and dorsum, except for the keels and bands, brown; entire margin of collum yellow; caudal half of caudal tergite yellow; yellow bands of almost uniform width cover the caudal one-third or one-half of the metatergites and are confluent with the yellow triangles, which cover the disto-lateral two-thirds of the keels. Keels wide, continuing the slope of the dorsum as in *Apheloria*. Pores open dorsad or latero-dorsad through the marginal welts. Anterior angles of all keels rounded, more so caudad. Caudal angles of keels of segments 2 through 14 are either a little obtuse or right angles; the keels of segments 15 through 19 are acute, becoming more so caudad; the apex of all keels is narrowly rounded. Keels of segment 19 about one-half as long and two-thirds as wide as those of segment 18. Anal tergite triangular, the apex narrowly truncate. Metazonites finely coriaceous; prozonites smooth. Sternites

smooth, glabrous. Sternites between legs 4, 5, and 6 each with a pair of low mounds. On segments behind the gonopods, there is a slight indication of a sternal spine adjacent to the second pair of legs. Beginning with the legs of about the ninth segment, the coxae bear very short spines. As unusual the spines of the second segment are much longer, becoming more so caudad.

Gonopods (Fig. 6) long, strongly curved as in *Apheloria* species. The distal differentiation of the telopodite closely resembles that of *A. picta* Hoffman, 1949. There is no indication of a prefemoral process. *In situ* the telopodites are directed meso-cephalad; they cross each other and then curve dorsad.

Type locality: Ohio, Ashland Co., Mohican State Park, one male, Aug. 1951, Leroy Gray.

Genus *Cibularia* Chamberlin and Hoffman 1950

***Cibularia profuga*, new species**

Figure 7

Diagnosis: Distal region of acropodite of telopodite abruptly constricted on lateral surface, thus distinguishing this species from *C. tuobita* (Chamberlin, 1910), in which this piece is gradually attenuated.

Male holotype: Width 5.1 mm., length 20 mm. Color as follows: orange triangles on keels, dorsum weak black-brown; venter, legs, and antennae cream. Tergites smooth. Dorsum moderately arched, the keels continuing the slope. Very little of prozonites exposed. Keels of most segments rectangular and very close to the adjacent keels. Keels of segments 2 through 4 directed laterad. Anterior angles of all keels rounded; posterior angles of all keels right except the last 4 or 5 pairs, where they are acute. Keels of segment 18 twice as long and broad as those of segment 19. Anal tergite triangular, the apex narrowly truncate. Annal valves strongly raised along mesial margin. Legs and sternites sparsely setose. Coxae and sternites unspined. Second article of all legs behind gonopods spined. Sternites between legs 3 and 4 each with a pair of inconspicuous, blunt processes.

A subdorsal view of the telopodite of the left gonopod is shown in figure 7. *In situ* the telopodites are subparallel, with both branches crossing each other near the apices. On the ventral surface the telopodite is setose almost one-half its length. Beyond the constriction, or heel, the apical region curves gently dorsad; the apical region of the prefemoral branch curves gently ventrad. The seminal canal opens at the apex of the acropodite.

Female paratype: Width 5.3 mm., length 22 mm. Color incompletely developed. Skeletal details are as in the male except that the posterior angles of the keels become acute on segment 13 rather than on 15 or 16.

Type locality: Arkansas, Montgomery Co., Mt. Ida, five miles south of the Ouachita River bridge, Apr. 14, 1954, three males, three females, one larva, under rocks.

This is the first record of any member of this genus from any state other than New Mexico. The facies, although very difficult to draw or describe, suggests close relationship with *Zinaria* Chamberlin, 1939.

Genus *Mimuloria* Chamberlin 1928

Mimuloria Chamberlin, 1928, Ent. News 39:155. Causey, 1952, Nat. Hist. Misc. 106:7-8.

In this genus the male gonopods are distinguished from those of the closely related *Nannaria* Chamberlin, 1918, by (1) the keel, which is set at a right angle to the end of the telopodite and (2) the flattened, triangular prefemoral branch, usually bearing processes.

Mimuloria castanea (McNeill)

Polydesmus castaneus McNeill, 1887, Proc. U. S. Natl. Mus. 10:329, pl. 12, fig. 8 (Bloomington, Monroe Co., Indiana).

Records: *Indiana*, Monroe Co., Bloomington, three males, width 4 mm., one female, width 4.7 mm., R. W. Siegel. *Missouri*, St. Louis Co., one male, width 3.6 mm., Mar. 9, 1952, E. P. Meiners

Not one of my specimens from Bloomington shows the apex of the telopodite exactly as figured by McNeill; in all of them a keel is attached at a right angle to the flattened end of the telopodite. The St. Louis specimen corresponds closely to the Bloomington specimens in the shape of the prefemoral branch and its short processes; this character may be expected to show some variation when the species is better known.

Mimuloria davidcauseyi (Causey)

Nannaria davidcauseyi Causey, 1950, Ent. News 61(7):194, figs. 3, 4 (Jasper, Newton Co., Arkansas).

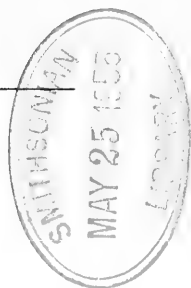
Records: *Kentucky*, Fayette Co., Lexington, one male, width 3.4 mm., Apr. 27, 1891; one male, May 18, 1892.

This species is known only from Arkansas and Kentucky. It differs from *M. castanea* principally in the prefemoral branch of the telopodite, which has a robust spine at least half as long as the distance from the origin of the spine to the end of the keel.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

STUDIES ON SPIROBOLOID MILLIPEDS.
II. A SECOND PAPER ON THE GENUS
EURHINOCRICUS

BY RICHARD L. HOFFMAN



My previous treatment of the genus *Eurhinocricus* (1953, Proc. Biol. Soc. Washington, 66: 179-183) rediagnosed the genus on the basis of gonopod structure, and admitted four species to the group in its emended sense. However, quite a few species of rhinocricids which, because of the shape of the posterior gonopod, should have been referred to *Eurhinocricus*, were omitted. These neglected millipeds included five described by Verhoeff and Chamberlin and simply overlooked; three published while the manuscript of my paper was in press; and a considerable number of West Indian species which had been inadequately described and whose identity was until quite recently unknown.

The forms belonging to the last category all are Jamaican, and represented in a rich and valuable collection loaned to me for study by Mr. C. Bernard Lewis, Director of the Institute of Jamaica. These species will be thoroughly treated in a systematic account of the diplopods of Jamaica, now in preparation. In my previous paper (*op. cit.*, p. 181) I wrote concerning one diagnostic character: "The usual transverse sulcus is replaced by a secondary one lying in front of the repugnatorial pores (a characteristic shared, however, with certain West Indian species of *Rhinocricus*)." Inasmuch as the Antillean species referred to have **proved to be congeneric** with *E. biolleyi*, the peculiarity may now be regarded as one exclusive with *Eurhinocricus*.

As treated in my summary, *Eurhinocricus* consisted of the following species:

<i>E. biolleyi</i> Brolemann	Cocos Islands
<i>E. omiltemae</i> Pocock	Guerrero
<i>E. tidius</i> (Chamberlin)	California
<i>E. parvissimus</i> Hoffman	Chiapas

In all of these forms, the posterior gonopod is a somewhat shortened appendage, its distal segment composed of a long, acicular solenomerite arising very near the coxal articulation, and two slender subparallel rods joined by a membrane. This plan is very constant, and is practically identical in all of the above named species as well as the others listed below. It will be noted that the occurrence of these species in widely

separated, high-altitude localities along the main Cordilleran uplift suggests a strong likelihood of reliction.

It is accordingly of exceptional zoogeographic interest to record the discovery that *Eurhinocricus* is the dominant spirobolid genus occurring on Jamaica, a circumstance affording the first good evidence of the relationship of the fauna of that island with the millipeds of the Central American mainland. In the rich material sent for study by the Institute of Jamaica, I find that at least eight established species of earlier workers are referable to *Eurhinocricus*, as well as an equal number of undescribed forms.

In the first paper of this series I proposed to base generic categories almost entirely upon sexual characters, to the exclusion of such developments as the number of antennal sensory cones, which, although quite useful for identification, occur in many forms which are entirely unrelated in gonopod structure. From the results of my study of the Jamaican collections, it would appear that still another superficial characteristic must be put aside as regards its utility as a generic distinction. This is the presence or absence of scobinae. There is no correlation between the incidence of those cavities and the configuration of the posterior gonopods; scobinae are present on some of the *Eurhinocricus* forms but not on others, a state of things duplicated in the case of typical *Rhinocricus* species (in both genera, Jamaican forms are now known in which scobinae are present in one sex and absent from the other!). The genus *Cubobolus* was set up by Chamberlin in 1918 for the West Indian rhinoecids lacking scobinae, and has embraced in the past about a half dozen forms widely divergent in size, structure, and distribution. Chamberlin himself regarded *Cubobolus* as a category of convenience, and remarked that it might have to be withdrawn into *Rhinocricus*. As I am ignorant of the sexual characters of *Cubobolus beliganus*, the generotype, I am unable to say whether the name is a synonym of *Rhinocricus* or of *Eurhinocricus*, but suspect that it belongs with the former, as *beliganus* is a Cuban species and no eurhinocricids are presently known to occur on that island.

The following list represents an attempt to account for all of the species described to date which appear to be referable to *Eurhinocricus*. That many others remain to be collected and described cannot be doubted.

Genus *Eurhinocricus* Brolemann

Eurhinocricus Brolemann, 1903, Ann. Soc. Ent. France, vol. 72, p. 131.—Pocock, 1907, Biol. Centr.-Amer., Diplop., pp. 68, 73.—Hoffman, 1952, Proc. Biol. Soc. Washington, vol. 66, pp. 179-183.

Type.—*E. bioleyi* Brolemann, by original designation.

Range.—Middle America, from southern California south to Panama; Jamaica.

Species.—20.

Eurhinocricus barrios Chamberlin

Eurhinocricus barrios Chamberlin, 1953, Amer. Midl. Nat., vol. 50, p. 138, figs. 11, 12.

Type locality.—Escobas, opposite Point Barrios, Guatemala.

Range.—Known only from the type locality.

Eurhinocricus biolleyi Brolemann

Rhinocricus (*Eurhinocricus*) *biolleyi* Brolemann, 1903, Ann. soc. ent. France, vol. 72, p. 132, pl. 1, figs. 1-6.—Pocock, 1907, Biologia Centrali-Americana, Diplopoda, p. 72.

Rhinocricus wheeleri Chamberlin, 1922, Proc. U. S. Nat. Mus., vol. 60, art. 8, p. 21, pl. 10, figs. 1-3 (type locality: Port Limon, Costa Rica).

Rhinocricus cocos Chamberlin, 1947, Proc. Acad. Nat. Sci. Philadelphia, vol. 99, p. 38, figs. 27, 28 (type locality: Chatham Bay, Cocos Islands).

Eurhinocricus biolleyi Hoffman, 1953, Proc. Biol. Soc. Washington, vol. 66, p. 182.

Type locality.—Cocos Islands.

Range.—Costa Rica, probably introduced into the Cocos Islands.

Synonymy.—I have already suggested that *cocos* is a synonym of *biolleyi*, since the type specimens of both are from the same place and since there is nothing in the descriptions and illustrations of the two that would indicate any significant differences.

In describing *R. wheeleri*, Chamberlin wrote "This form differs from other Central American species in having an anterior or secondary sulcus deeply impressed across dorsum, whereas the primary sulcus is obliterated above." But such a condition had already been noted in the description of *biolleyi*, and was repeated by Pocock in the Biologia! The gonopods of *wheeleri*, *cocos*, and *biolleyi* are identical, as can be ascertained by reference to illustrations given in the works cited above. Nor is there any difference between the three in size or segment number.

Eurhinocricus chichivacus Chamberlin

Eurhinocricus chichivacus Chamberlin, 1953, Amer. Midl. Nat., vol. 50, p. 139, figs. 1, 2.

Type locality.—Chichivac, near Tecpam, Guatemala.

Range.—Known only from the type locality.

Eurhinocricus cingendus (Loomis)

Rhinocricus cingendus Loomis, 1937, Bull. Mus. Comp. Zool., vol. 80, p. 218, figs. 5, 6.

Type locality.—Main Ridge, Blue Mountains, Jamaica.

Range.—The Blue Mountains, St. Andrew Parish, Jamaica.

Eurhinocricus cockerelli (Pocock)

Rhinocricus cockerelli Pocock, 1894, Journ. Linnean Soc. London, (Zool. Ser.), vol. 24, p. 505.

Type locality.—Mandeville, Manchester Parish, Jamaica.

Range.—Central and eastern parishes of Jamaica, at lower elevations.

Eurhinocricus eutypus Chamberlin

Eurhinocricus eutypus Chamberlin, 1953, Amer. Midl. Nat., vol. 50, p. 139, figs. 21, 22.

Type locality.—Volcan Tajumuleo, Guatemala.

Range.—Known only from the type locality.

Eurhinocricus fissus Verhoeff

Eurhinocricus fissus Verhoeff, 1937, Zool. Anz., vol. 118, p. 97.

Type locality.—Sierra de la Victoria, between Todos Santos and Miraflores, Baja California.

Range.—Known only from the type locality.

Eurhinocricus gossei (Pocock)

Rhinocricus gossei Pocock, 1894, Journ. Linnean Soc. London, (Zool. Ser.) vol. 24, p. 490, pl. 38, fig. 2.—Chamberlin, 1918, Bull. Mus. Comp. Zool., vol. 62, p. 186.

Cubobolus gossei Chamberlin, 1922, Proc. U. S. Nat. Mus., vol. 61, art. 10, p. 10.

Type locality.—Jamaica.

Range.—Western end of Jamaica, in the Bluefields Mountains and vicinity.

Eurhinocricus heteroscopus (Chamberlin)

Rhinocricus heteroscopus Chamberlin, 1918, Bull. Mus. Comp. Zool., vol. 62, p. 194.

Type locality.—Liguanea Plain, Jamaica.

Range.—Lower portions of St. Andrew and adjoining parishes, Jamaica.

Eurhinocricus insulatus (Chamberlin)

Rhinocricus insulatus Chamberlin, 1925, Proc. Biol. Soc. Washington, vol. 38, p. 39.

Type locality.—Barro Colorado Island, Panama.

Range.—Known only from the type locality.

Eurhinocricus mandevillei (Pocock)

Rhinocricus mandevillei Pocock, 1894, Journ. Linnean Soc. London, (Zool. Ser.), vol. 24, p. 489.

Type locality.—Mandeville, Manchester Parish, Jamaica.

Range.—Central parishes of Jamaica.

Eurhinocricus omiltemae (Pocock)

Rhinocricus omiltemae Pocock, 1907, Biologia Centrali-Americana, Diplopoda, p. 67, pl. 6, figs. 12a-c.

Type locality.—Omilteme, Guerrero.

Range.—Known only from the type locality.

Eurhinocricus parvior (Chamberlin)

Rhinocricus parvior Chamberlin, 1918, Bull. Mus. Comp. Zool., Vol. 62, p. 191.

Type locality.—Liguanea Plain, Jamaica.

Range.—Known only from the type locality (northern suburbs of Kingston, St. Andrew Parish, Jamaica).

Eurhinocricus parvissimus Hoffman

Eurhinocricus parvissimus Hoffman, 1953, Proc. Biol. Soc. Washington, vol. 66, p. 182, figs. 1, 2.

Type locality.—Volcan de Tacana, above Cacahuatan, Chiapas.

Range.—Known only from the type locality.

Eurhinocricus pygmoides (Chamberlin)

Rhinocricus pygmoides Chamberlin, 1933, Pan-Pacific Entom., vol. 9, p. 22 (2 figs.).

Type locality.—Parismina, Costa Rica.

Range.—Known only from the type locality.

Eurhinocricus sabulosus (Pocock)

Rhinocricus sabulosus Pocock, 1894, Journ. Linnean Soc. London (Zool. Ser.), vol. 24, p. 504, pl. 38, fig. 12.

Type locality.—Mandeville, Manchester Parish, Jamaica.

Range.—Central and eastern parishes of Jamaica, along the southern half of the island.

Eurhinocricus solitarius (Pocock)

Rhinocricus solitarius Pocock, 1894, Journ. Linnean Soc. London, (Zool. Ser.), vol. 24, p. 496, pl. 38, fig. 6.

Type locality.—Jamaica.

Range.—Not known with certainty; probably the central parishes of Jamaica.

Eurhinocricus storkani Verhoeff

Eurhinocricus storkani Verhoeff, 1937, Zool. Anz., vol. 118, p. 98.

Type locality.—Manzanillo [Colima?] Mexico.

Range.—Known only from the type locality.

Eurhinocricus townsendi (Pocock)

Rhinocricus townsendi Pocock, 1894, Journ. Linnean Soc. London, (Zool. Ser.), vol. 24, p. 505.

Type locality.—Jamaica.

Range.—North coast of Jamaica; Westmoreland, St. Mary, St. Ann, and Portland parishes.

Eurhinocricus williamsi (Chamberlin)

Rhinocricus williamsi Chamberlin, 1940, Bull. Univ. Utah, Biol. Ser. vol. 5, no. 6, p. 15.

Type locality.—Barro Colorado Island, C. Z., Panama.

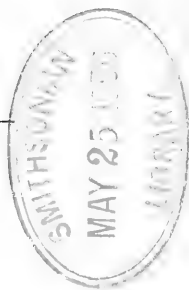
Range.—Known only from the type locality.

Remarks.—This may prove to be a synonym of *E. insulatus*, which was also described from Barro Colorado Island. However, the gonopods of neither form have been illustrated, and assumption of their specific identity seems premature at this time.

PROCEEDINGS
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A NEW SUBSPECIES OF *BLARINA BREVICAUDA*
FROM FLORIDA

BY W. J. HAMILTON, JR.
Cornell University



Field work in February and March, 1954 in the vicinity of Fort Myers, Lee County, Florida resulted in the taking of 27 shorttail shrews in a restricted area. These shrews are recognizably distinct from *Blarina brevicauda peninsulae* and *Blarina brevicauda carolinensis*.

Blarina brevicauda shermani, subsp. nov.

Type.—Adult female; skin and skull; Cornell University Mammal Collection Number 8026; two miles north of Fort Myers, Lee County, Florida. Collected February 13, 1954, by W. J. Hamilton, Jr., original number 4280. The type has the following measurements (in millimeters): total length, 115; tail, 23; hind foot, 15; condylobasal length, 21.6; cranial breadth, 10.7; interorbital breadth, 5.5; palatal length, 8.8; maxillary breadth, 7.3; maxillary tooth row, 8.3. Weight 14 grams. Skull measurements follow those of Jackson (N. A. Fauna 51, 1928). This shrew is named for Dr. Harley B. Sherman, who has contributed materially to our knowledge of Florida mammalogy.

Diagnosis.—A medium sized dark *Blarina*, larger and darker than *peninsulae*. Adult winter pelage darker than other races of *brevicauda*. The dark pelage, without trace of brown, combined with the larger size, both in body proportions and skull, serves to distinguish this *Blarina* from other Florida races. Skull robust, the cranium and rostrum relatively broad.

Comparisons.—This presumably isolated subspecies may at once be separated from other recognized Florida forms by its darker pelage and larger size. Comparable measurements of *shermani*, *peninsulae* and *carolinensis*, all from Florida, are presented in Table 1.

Remarks.—As with most *Blarinas*, this race occupies a variety of habitat. In 4000 trap nights in the type locality (one mile north of the Edison Bridge that spans the Caloosahatchee River and a quarter mile east of Route 41, specimens were taken in drainage ditches overgrown to grass, and in the tunnels of *Scalopus aquaticus bassi*. All specimens were adult, the males with enlarged testes and most of the females with turgid vagina and swollen uterine horns, although no macroscopic evidence of embryos was apparent. This relatively large shrew appears to occupy an isolated area well removed from *peninsulae* to the north and south. That it has not been previously described suggests a "blind

spot'' in Florida mammal collecting. In the same habitat with this shrew, *Oryzomys*, *Sigmodon*, *Peromyscus gossypinus* and *Cryptotis* were taken. Previous collecting (2000 trap nights) south of the Caloosa-hatchee River in Fort Myers in the spring of 1939 and 1940 did not yield a *Blarina*. Nor did collecting on Pine Island, Lee County, provide evidence of this shrew in 1954. Presumably it has a general distribution on the west coast of the southern Florida peninsula; this must wait on further collecting. For the loan of specimens, I am indebted to H. B. Sherman, University of Florida; H. E. Anthony, American Museum of Natural History, W. H. Burt, University of Michigan; Viola S. Schantz, Fish and Wildlife Service, and Richard Archbold, Lake Placid, Florida. Comparisons have been made with specimens in the Cornell collection. Paratypes have been deposited in the U. S. National Museum.

TABLE 1. AVERAGE AND EXTREME MEASUREMENTS IN MILLIMETERS OF FLORIDA BLARINA

	Length	Tail	Hind foot	Weight grams	Condylor-basal length	Cranial breadth	Inter-orbital breadth	Palatal length	Max. breadth	Max. tooth row
<i>B. b. shermani</i> (27 skins and 25 skulls; weights of 27)	Ave.	109	23.5	14.1	13.8	21.0	10.8	5.5	9.0	7.3
	Max.	116	25	15	17.0	21.6	11.2	5.7	9.4	7.5
	Min.	100	22	13.5	11.1	20.4	10.4	5.4	8.7	7.3
<i>B. b. peninsulæ</i> ¹ (21 skins and 7 skulls; weights of 10)	Ave.	97	21.3	12	9.9	20	10.5	5.3	8.7	7.5
	Max.	110	25	14	11.0	20.5	10.6	5.4	8.9	7.8
	Min.	82	18	10	8.1	19.8	10.2	5.2	8.5	7.3
<i>B. b. carolinensis</i> ² (17 skins and skulls; weights of 11)	Ave.	92.2	21	12.5	8.0	19.3	10.3	5.2	8.1	7.0
	Max.	102	26	14	10.3	20.1	10.8	5.0	8.7	7.3
	Min.	84	18	11.5	5.5	18.1	9.7	5.5	7.5	6.4

¹The *peninsulæ* examined include topotypes and specimens from Highland and Collier County, Florida.²The *carolinensis* collected in Alachua and Putnam counties, Florida.

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VARIATION IN THE WHITE-THROATED FANTAIL
FLYCATCHER, *Rhipidura albicollis*

By S. DILLON RIPLEY

Study of some eighty-one specimens of the White-throated Fantail Flycatcher, *Rhipidura albicollis*, has been prompted by looking over the collection of birds which Mr. Sálím Ali has recently made in Orissa and eastern central India. For help in assembling this series, my thanks are due not only to Mr. Ali and the Bombay Natural History Society, but also to the authorities of the U. S. National Museum, the Academy of Natural Sciences and the American Museum of Natural History. I am also grateful to Mr. H. G. Deignan for valuable comments.

On bringing together such a representation of the species it became apparent that there was a considerable range of variation in pattern and color. In general the White-throated Fantail Flycatcher is a rather dark, unobtrusively-colored bird, black on the crown and ear coverts, slaty-black on the upper part of the chest, and slate-gray on the breast and abdomen. The back is mouse grey in color and the wings are a dark dull olive brown. There is a broad white superciliary streak, the throat has white tipped feathers with slate colored bases, and the blackish-brown tail is white tipped except for the two central retrices.

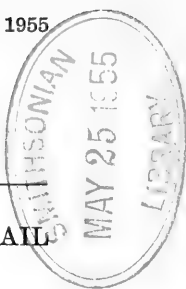
Analyzing the differences between the populations, it is possible to recognize certain races which may be listed as follows:

1. a.) *Rhipidura albicollis canescens* (Koelz)

Leucocirca albicollis canescens Koelz, 1939, Proc. Biol. Soc. Wash. 52: 68 (Bhadwar, Punjab).

This subspecies is paler, more ashy on the back, breast and belly than the nominate form as it was described by Koelz, although Whistler (1942, Jour. Bombay Nat. Hist. Soc. 43: 35) felt that in series the differences cited by the describer would not stand up. My impression is that birds from the western Himalayas are clinally different in just the characters cited by Koelz and that they occupy a considerable geographic range.

Range.—From Kashmir along the Himalayas to western Nepal at moderate elevations from the edge of the plains up to 6,000 feet in scrub, bamboo clumps and deciduous and evergreen forest, descending in winter to the adjacent plains of west and east Punjab in West Pakistan and India (Jhelum and Ambala). Specimens from Chisapani and Tika-



pur in the Karnali drainage area in west Nepal collected by us on the National Geographic Society-Yale-Smithsonian Institution Expedition in 1948-9, show that this is the meeting place of *canescens* and the typical form. Of four specimens from these adjacent localities, two are typical *albicollis*, while the other two are definitely paler, nearer *canescens*. All four were taken in December and January, no two on the same day.

b) *Rhipidura albicollis albicollis* (Vieillot)

Platyrrhynchus albicollis Vieillot, 1818, Nouv. Dict. d'Hist. Nat. 27: 13 (Bengal).

The nominate subspecies, of which I have examined a freshly-collected toptype from Chandpara, a few miles east of Calcutta, is black on the crown, earcoverts and upper breast, and slate gray on the breast and abdomen without paler edges to the feathers. The back is mouse gray.

Range.—From western Nepal east along the Himalayas to Sikkim where intergrades occur with the following form, south in U.P., Bihar and West Bengal to the vicinity of Calcutta, in the lowlands wherever suitable stands of deciduous and evergreen forest and scrub occur. Presumably this form is migratory, occurring in the lowlands in winter, and returning to the Terai, Duars and foothills in the spring.

c) *Rhipidura albicollis stanleyi* Baker

Rhipidura albicollis stanleyi Baker, 1916, Bull. Brit. Orn. Club, 36: 81, new name for: *Rhipidura albicollis kempi* Baker, 1913 (September) Rec. Ind. Mus. 8: 275. (Abor Hills), preoccupied by *Rhipidura flabelifera kempi* Mathews and Iredale, 1913 (July 1).

This population of *albicollis*, which Baker later decided was not recognizable (1924, Fauna of British India. Birds, 2: 279), is in fact distinctly darker than the nominate form. The slate black of the upper breast merges more gradually into the slate color of the breast and abdomen than in *albicollis*. The underparts are in general deeper, more purely slate-colored than in *albicollis* and the back color is darker and richer also, very dark mouse gray with an infusion of clove brown. The tail is blackish in tone rather than dark blackish brown. It is perhaps needless to point out that critical examination in this species is really dependent on fresh material. I have seen no toptypes of *stanleyi* from the Abor Hills, but we have material taken from the Mishmi Hills on the 1947 Yale-Smithsonian Expedition, as well as considerable material from Assam in general of even later date.

Range.—From Sikkim where it intergrades with the nominate form, east through Bhutan, Assam, the northeastern Hills of East Pakistan, to northern Burma from the Chin Hills north along the Chindwin drainage system to Myitkina District and north and east to the N'Mai River, in the hills, descending to the adjacent plains in winter.

d) *Rhipidura albicollis orissae*, subsp. nov.

Type.—♂ ad. (Yale Peabody Museum No. 24864), collected December 15, 1949, by Sálím Ali at Toda, Bonai, Orissa. Paratype.—♂ ad. (Bombay Natural History Society Registry No. 16992), collected on the same date by Sálím Ali at the same locality.

Diagnosis.—From *albicollis*, this subspecies differs by being dark olive-brown rather than mouse gray on the back and scapulars, this color

being clearly demarcated on the hind nape, from the rich black of the forehead and crown. Below, *orissae* is slaty on the breast, fading to slate-gray on the abdomen with a distinct patch of buff or cream in the center of the belly, running to the vent. The tips of the tail feathers are creamy buff rather than pure white as in typical *albicollis*. From *canescens* and *stanleyi* this form differs as it does from *albicollis*, being altogether paler, more brownish, and with a noticeable patch on the lower abdomen, in this latter character alone showing an approach to the Javan form, *euryura*.

Range.—Orissa in Boad, Sambalpur, the Simlipal Hills (Mayurbhanj), Keonjhar and Bonai, and presumably in M.P. in the upper Godavari Valley (Bastar) and Raipur, *vide* Ball, (1878, *Stray Feathers*, 7: 211).

e) *Rhipidura albicollis celsa* Riley

Rhipidura albicollis celsa Riley, 1929, *Proc. Biol. Soc. Wash.* 42: 166. (Khun Tan, N. Thailand).

Compared to *stanleyi*, *celsa* is a lighter colored bird, the back paler clove-brown, the tail dark brown rather than black. The breast and abdomen are plumbeous, the feathers often tipped or edged with ashy or drab. Although compared to typical *albicollis*, the upper parts of *celsa* are similar, the underparts are distinctly paler, more grayish or plumbeous with the characteristic pale tips on the lower breast and abdomen (13 out of 16 specimens show this in the series). From *canescens* this form may be distinguished by the darker back, although the underparts are very similar, with the sole addition of the pale edging as noted.

Range.—Burma in the extreme NE, east of the N'Mai River (Htaw-gaw), Tenasserim, and presumably the easternmost Shan States, Yunnan and SW. Szechuan in China, Thailand, and Indochina in N. Laos, N. Annam and Tonkin.

f) *Rhipidura albicollis cinerascens* Delacour

Rhipidura albicollis cinerascens Delacour, 1927, *Bull. Brit. Orn. Club*, 47: 156 (Djiring, S. Annam).

This form differs from *albicollis* by being paler above and below with a tendency to pale drab tips to the feathers of the abdomen and under tail coverts. Compared to *celsa* it is paler on the back, less olive-tinted, the brown tone more hair brown. Below also it is paler, the abdomen and under tail coverts with feather edgings of drab. This is a paler, less olive-tinted bird on the upper parts than *orissae*, and more plumbeous below with darker drab edgings.

Range.—Indochina in southern Annam.

g) *Rhipidura albicollis atrata* Salvadori

Rhipidura atrata Salvadori, 1878, *Ann. Mus. Civ. Genoa*, 14: 203. (Padang, W. Sumatra).

Rhipidura albicollis robinsoni Chasen, 1941, *Treubia*, 18, Suppl: 61 (Bukit Fraser, Pahang, Malaya).

Chasen (t.c. *supra*.) separated the Malay Peninsula population of the White-throated Fantail Flycatcher on the basis of the larger white tips to the outer tail feathers. My series does not support his contention, nor can I find any other significant difference between birds from the two areas.

Atrata is a darker form than typical *albicollis* both above and below, although it is quite distinct from *stanleyi* in the color of the back which is far more clove brown, rather than dark mouse gray.

Range.—Malaya and Sumatra.

h) *Rhipidura albicollis kinabalu* Chasen

Rhipidura albicollis kinabalu Chasen, 1941, *Treubia*, 18, Suppl.: 62. (Mt. Kinabalu, British North Borneo)

This form differs from *atrata* only in the lessened area of white on the tail.

Range.—Mount Kinabalu, British North Borneo and north Sarawak south at least to the Kelabit Plateau.

i) *Rhipidura albicollis sarawacensis* Chasen

Rhipidura albicollis sarawacensis Chasen, 1941 *Treubia*, 18, Suppl. 62. (Mt. Poi, west Sarawak)

I have not examined specimens of this population which on the basis of the original description sounds like a well-marked form, viz: "upper parts as in *kinabalu*, but under parts including the under tail coverts paler, about as in the typical race. White in the plumage everywhere accentuated. The supercilia broad and extending the full length of the crown; the white tail tips even longer than in *robinsoni* (= *atrata*), and the breast and center of the abdomen mixed with white."

Range.—Mount Poi, west Sarawak.

Allied Species

2. *Rhipidura euryura* S. Müller

Rhipidura euryura S. Müller, 1843, in Temminck's *Verh. Nat. Gesch. Land-en Volkenk*: 185, footnote. (Java)

This species seems to me to be a representative form on Java, and I would so include it as a member of the superspecies, *albicollis*. It differs from the other populations of the superspecies in being bluish-slate on the upper and lower surfaces of the body, rather duller below, in having the white tips of the tail feathers reduced to the two outer pairs and in having white on the abdomen and under tail coverts. The thighs are brownish. However, the tendency to increase or reduction of white tips on the tail exists within the species *albicollis*. The increase of white on the lower surface is already heralded in other forms such as *orissae*, and *sarawacensis* (vide, Chasen, t.c.). The bluish slate color of the upper and under parts is an accentuation of the trend towards plumbeous in forms such as *celsa*. Like the forms of *albicollis*, the wing and tail feathers and a large area on the head are blackish, and there is a similar broad white superciliary streak.

Chasen (1935, *Bull. Raffles Mus.* No. 11: 175) unaccountably states that he believes that *Rhipidura phoenicura* of Java may be a representative of *albicollis*. I cannot agree with this, feeling that *euryura* is closely allied to *albicollis*. *Phoenicura* with its chestnut rump and tail seems to me closer to some of the Philippine or Papuan species than to the Indo-Malayan Fantails.

Range.—Java. (There are unconfirmed records for the species on Sumatra and Borneo.)

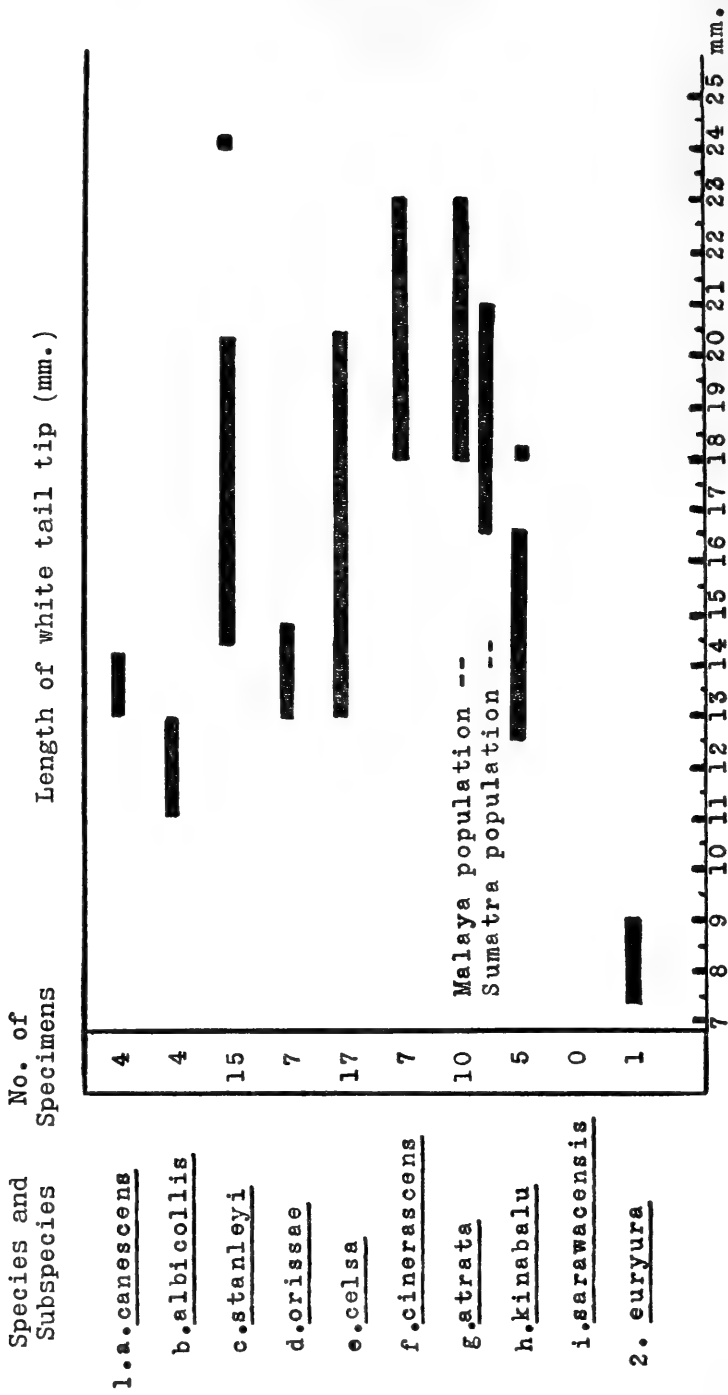
Measurements

In over seventy of the specimens of this species from all parts of the range, I have been unable to find any measurements which would indicate that there is a significant difference in size within the populations. Individual birds from the mountains of Kashmir (*canescens*) and Yunnan (*celsa*) seem large, but this would be expected according to Bergmann's Rule. Birds from the southern parts of the range do not seem significantly smaller. Wing measurements range from 76-85 mm. (*cinerascens*), to from 70.5-80.5 mm. (*stanleyi*). This encompasses the whole range of variation for the species. Similarly the tail varies from a low of 90 mm. (*euryura*) to 109 mm. (*celsa*), with all other populations fitting within this range. The culmen varies from 11-15 mm. throughout the superspecies.

The single measurement which seems to vary in a significant way among the populations is the length of the white tail tip of the outermost rectrix, measured along the inner web at the shaft. This is listed below:

In the above measurements, two single specimens are listed under *stanleyi* and *kinabalu* which fall well outside the range of the others.

From the above it will be seen that *cinerascens* and *atrata* appear to have the greatest extent of white on the tail, while within *atrata* the Sumatran population (*atrata*) overlaps the Malayan population ("rob-insoni") in more than 75% of the specimens measured. On the basis of this series there seems to be a pronounced difference in the size of the white tail area between typical *albicollis* and *stanleyi*, formerly synonymized with it. These differences appear to be nonadaptive, and they do not vary clinally.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FIVE NEW VENEZUELAN BIRDS AND NINE
EXTENSIONS OF RANGES TO COLOMBIA

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

Besides describing new subspecies from our collection, we are extending the ranges of birds from Venezuela to Colombia.

From July 20 to August 9, 1953, Ramón Urbano made a collection on the summit of Cerro Alto del Cedro, Zulia, the easternmost of the Montes de Oca at the northern end of the great Sierra de Perijá which from this point south forms the boundary between Venezuela and Colombia.

Cerro Alto del Cedro is only 450 meters high and has a tropical avifauna. It is partly in Venezuela and partly in Colombia. The international frontier runs across the summit, changing its west to east direction to east of north at the marker on the top. The summit camp was only a few meters from the boundary post. Consequently, the birds collected there were taken on either Venezuelan or Colombian soil and may be considered as of both countries.

A collection was also made at the northern base of the mountain at Hato La Esperanza, 50 meters above sea level, through which the boundary line also passes, the boundary marker being close to the farm house. So, all specimens collected at both localities may be considered as both Venezuelan and Colombian.

Burgua, a locality mentioned several times in this paper, is in the Orinoco watershed in the extreme southwestern corner of the state of Táchira, on the boundary with the state of Apure, about 20 kilometers from the Colombian frontier, in the lowlands drained by the Río Apure. There are open cultivated areas and dense forest. Collections were made from 350 to 530 meters.

Cerro El Teteo rises immediately to the west of Burgua and is on the foothills of the Páramo de Tamá, 30 kilometers to the northwest. It is covered with virgin forest. Collections were made from 800 to 1250 meters. Subtropical species occur there as the land continues to rise to the very high Páramo de Tamá.

We are indebted to the Curators of the collections in the American Museum of Natural History, Carnegie Museum, Chicago Natural History Museum, Museum of Comparative Zoology, Philadelphia Academy of Natural Sciences and the U. S. National Museum for access to their collections.

Specimens listed are in the Phelps Collection, Caracas, unless otherwise specified. Names of colors are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature," 1912. Wing measurements are of the chord.

Pauxi pauxi gilliardi Wetmore and Phelps

Pauxi pauxi gilliardi Wetmore and Phelps, Journ. Wash. Acad. Sci., 33, No. 5, p. 144, May 15, 1943. (Tierra Nueva, Sierra de Perijá, Magdalena, Colombia.)

1 ♀, Burga (San Luis), Táchira; 500 meters.

Hitherto the species had only been collected in the Venezuelan Andes from the Caracas to the Mérida regions (*P. p. pauxi* (Linné)), the Sierra de Perijá on both the Venezuelan and Colombian sides (*P. p. gilliardi*) and in Bolivia (*P. p. unicornis* Bond and de Schauensee).

However, it has been reported far away from the above range. Hellmayr and Conover¹ say: "The reported occurrence in Cayenne, eastern Perú (Maynas) and Colombia (Santa Marta), as well as in southern Venezuela (banks of the Río Casiquiare and upper Orinoco) has never been corroborated." Slater² says: "Natterer heard of this bird's existence when in the upper Río Negro, and has recorded that, according to information received from the natives, it occurs on the Río Casiquiare and adjoining parts of the Orinoco, and is called by the natives 'Pauxi de Piedra,' or Stone Curassow . . ."

The Burgua bird constitutes the first positive record of the species in the Orinoco watershed lowlands.

Larus argentatus smithsonianus Coues

Larus argentatus smithsonianus Coues, Proc. Acad. Nat. Sci. Phila., 14, p. 296, 1862. (Eastern and western coasts of North America.)

1 (?) juv., Isla de Aves, Venezuela.

This specimen constitutes an extension of range of the species to Venezuela.

It was collected on April 18, 1954, on the Phelps-Academia de Ciencias Físicas, Matemáticas y Naturales Expedition to Isla de Aves, on the yacht "Ornis." No other specimens were seen. A number of Laughing Gulls (*Larus atricilla*) were observed but they were not breeding. Several hundred thousands Sooty Terns (*Sterna fuscata*) were breeding as well as a lesser number of Noddies (*Anous stolidus*), which nested on the ground, there being no bushes nor trees.

The Venezuelan "Isla de Aves" is situated about 460 kilometers north of Margarita Island and 180 west of Dominica. It is 600 meters long and its greatest width is 150 meters.

The Herring Gull ranges south during the winter to Panamá, Cuba, Haiti, Jamaica, Virgin Islands and Barbados, according to Bond (Check List of Birds of the West Indies, p. 50, 1950).

Heliangelus amethysticollis verdiscutus, new subspecies

Type: From Villa Páez, Páramo de Tamá region, Estado Táchira, Venezuela; 2500 meters. No. 10,810, Phelps Collection, Caracas. Adult male collected February 14, 1941, by Ventura Barnés Jr. (Type on deposit at American Museum of Natural History.)

Diagnosis: Nearest to *H. a. violiceps* Phelps and Phelps Jr., of the Perijá Mountains, Venezuela, from which it differs by more greenish,

¹ Birds of the Americas, etc., Part 1, No. 1, p. 119, 1942.

² Trans. Zool. Soc. London, 19, Part 4, p. 285, July, 1875.

less bluish frontal shield; from *H. a. clarisse* (Longuemare), eastern Colombia, as well as from the other known races, differs by a coppery purplish crown instead of green uniform with the back.

Range: Known from the Páramo de Tamá region of Venezuela and from the Páramo de Tamá, Colombia, in the Subtropical and Temperate Zones at altitudes from 2060 to 3000 meters.

Description of Type: Lustrous frontal shield nearest to Cendre Green; crown Dark Livid Purple merging on the nape into the Parrot Green of the back and upper tail-coverts; rump more bronzy; lores and sides of head blackish; a small white postocular spot. Chin blackish; throat lustrous Purple; a white band separating the purple throat from the glittering yellowish green of the lower breast and sides; flanks Parrot Green; feathers of abdomen with greenish centers and buffy margins; lower tail-coverts white with prominent brownish shaft stripes. Remiges Dark Vinaceous Drab; greater wing-coverts dusky greenish; lesser ones greenish bronze uniform with back; greater under wing-coverts uniform with remiges; lesser ones yellowish green. Median rectrices Krombergs Green; remainder blackish with a purplish tinge, the outer two pairs faintly tipped with whitish.

Bill (in life) "black"; feet "black"; iris "dark". Wing, 66.5 mm.; tail, 40; exposed culmen, 17.5; culmen from base, 23; tarsus, 5.

Remarks: Sexes unlike in color; the males have longer wings and tails. Size similar to *violiceps* and *clarisse*. Range of measurements: five adult males, including type—wing, 65-66.5 (66.1) mm.; tail, 40-41 (40.2); exposed culmen, 18-18.5 (18.2); four adult females—wing, 59-61.5 (60.4); tail, 36-38 (37); exposed culmen, 19-19 (19). Measurements of *violiceps*: five adult males—wing, 65-71 (69); tail, 38-41 (40.2); exposed culmen, 16-17 (16.5). Five adult [males] of *clarisse*, "Bogotá" skins—wing, 63-75 (69); tail, 40-42 (40.8); exposed culmen, 16-17 (16.8).

The female differs by having the crown green uniform with the back; the gorget bluer and restricted in size, the rest of throat being blackish without iridescence; the wings and tail shorter.

One specimen is a female apparently immature. It differs from the other females in having the gorget still bluer and restricted to a few feathers on the chin; the rest of chin and throat is blackish, the feathers with fine white shaft stripes.

Specimens Examined

H. a. violiceps.—VENEZUELA: Cerro Pejochaina, 14 ♂, 1 [♂]; 1 [♀]; Cerro Tetarí, 2 [♂], 2 ♀, 1 [♀], 1 juv.; Fila Macoíta-Apón, 3 [♂], 1 ♀.

H. a. verdiscutus.—VENEZUELA: Páramo de Tamá, 1 ♂, 1 ♂³, 1 ♀; Villa Páez, 5 ♂ (inc. type), 2 [♂], 1 ♀, 1 [♀], 1 ♀ juv.; Las Delicias, 1 ♂, 1 ♀. COLOMBIA: Páramo de Tamá, Norte de Santander,³ 3 ♂, 1 ♂ juv.

H. a. clarisse.—COLOMBIA: Cachiri, Santander, 1 ♂⁴; "Colombia,"⁵ 6⁴; var. locs.⁵, 56⁶.

³ Specimens in Chicago Natural History Museum.

⁴ Specimens in Philadelphia Academy of Natural Sciences.

⁵ Specimens in American Museum of Natural History.

⁶ For localities see Zimmer, Am. Mus. Nov., No. 1540, p. 28, Dec. 3, 1951.

H. a. laticlavus.—ECUADOR⁵: 6⁶.

H. a. decolor.—PERÚ⁵: 8⁶

H. a. amethysticollis.—PERÚ⁵: 7⁶. BOLIVIA⁵: 4⁶.

Dendrocincla homochroa meridionalis Phelps and Phelps Jr.

Dendrocincla homochroa meridionalis Phelps and Phelps Jr., Proc. Biol. Soc. Wash., 66, p. 133, August 10, 1953. (Burgua, Táchira.) 4 ♂, 3 ♀, Cerro Alto del Cedro (summit, 450 m.), Colombian boundary.

1 ♂, 1 (?) Cerro Alto del Cedro (Hato La Esperanza, 50 m.), Colombian boundary.

These specimens constitute an extension of range from northwestern Venezuela to Colombia.

In the original description the range of this subspecies was confined to the upper Apure valley, near the Colombian frontier, in the states of Táchira, Barinas and Apure. In the same publication the population of the Sierra de Perijá, Zulía, in Perijá, and of the extreme northwestern tip of Lara, was called *D. h. ruficeps* Selater and Salvin, of eastern Panamá.

From July 20 to August 9, 1953, the above additional series was obtained. These new specimens show that they cannot be separated from those from the Apure valley, nor from those from Perijá, collected in 1940, and that they are all *meridionalis*. Therefore *ruficeps* ceases to have a Venezuelan range and is confined to eastern Panamá; de Schauensee, in "The Birds of the Republic of Colombia,"⁷ does not give a Colombian range to the species *homochroa* so the species jumps across northern Colombia from Panamá to the Venezuelan border.

Cranioleuca subcristata fuscivertex, new subspecies

Type: From Burgua, upper Apure valley, Táchira, Venezuela; 350 meters. No. 58748, Phelps Collection, Caracas. Adult female collected November 16, 1952, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Striping on top of head more prominent, blacker, less brownish, than in the nominate form.

Range: Known from two specimens from the headwaters of the Uribante and Apure rivers, near the Colombian frontier.

Description of Type: Top of head streaked broadly with Fuscous and very narrowly (edges of feathers) with buffy gray; back Medal Bronze, paler on rump; upper tail-coverts mixed with rufous; post-superciliary stripe grayish; sides of head grayish olive. Chin and anterior throat whitish merging into the Deep Olive-Buff X Dark Olive-Buff of posterior throat, breast, sides and abdomen; flanks, sides and under tail-coverts brownish. Remiges Benzo Brown margined externally with Cinnamon-Rufous, more narrowly and paler on primaries, brighter and more extensive on tertials; inner webs of remiges margined with Light Ochraceous-Salmon, except apically on primaries; primary coverts Benzo Brown margined with Cinnamon-Rufous; median and lesser coverts Cinnamon-Rufous; under wing-coverts and axillaries mixed Orange-Buff and Light Ochraceous—Salmon. Tail Hazel, under surface duller.

Bill (in life) "maxilla brown; mandible flesh color"; feet "greenish

⁷ Caldasia, 5, Nos. 22-26, pp. 221-1214, Sept. 15, 1948-July 1, 1952.

yellow''; iris ''chestnut.'' Wing, 61 mm.; tail, 59; exposed culmen, 12.5; culmen from base, 16.5; tarsus, 18.

Remarks: Size similar to *subcristata*. Range of measurements: two adult females, including type—wing, 61-61 (61) mm.; tail, 59-62 (60.5); culmen from base, 16.5-17 (16.7). Measurements of *subcristata*, from the Caracas region: five adult males—wing, 60-65 (62.8); tail, 62-72 (65.6); culmen from base, 15.5-17 (16.2); five adult females—wing, 58-61 (58.8); tail, 60-67 (62.6); culmen from base, 15-17 (15.8).

The second specimen, from Guasqualito, Apure, is similar to the type except that the under parts are lighter, Olive-Buff by Deep Olive-Buff. This new subspecies extends the range of the species from the mountainous north coast region of Venezuela and eastern Colombia to the upper Apure River basin.

Specimens Examined

C. s. subcristata.—VENEZUELA: Zulia—Santa Rosalía, Perijá, 1 ♂; Mene Grande, 1 ♂, 1 ♀. Barinas—Altamira, 2 ♂. Lara—Cubiro, 1 ♂, 1 ♀; Cerro El Cerrón, 1 ♀; Guarico, 1 ♂. Falcón-San Luis, 3 ♂, 2 ♀. Yaracuy—Lagunita de Aroa⁸, 2 ♂ 1 ♀. Carabobo—Sierra de Carabobo, 5 ♂⁸; 1 ♂, 4 ♀; El Trompillo, 1 ♂⁸; Cumbre de Valencia, 1 ♀⁵; Mariara, 1 ♂. Aragua—Ocumare de la Costa, 1 ♂⁹; La Victoria, 1 ♀. Distrito Federal—El Limón⁸, 1 ♂, 2 ♀; Puerto de la Cruz, 1 ♀⁸; El Junquito, 1 ♀; El Valle, 1 ♂; Baruta, 1 ♂; Galipán, 1 ♀⁵; Silla de Caracas, 1 ♂; Caracas³, 1 ♂, 3 ♀; Loma Redonda, 2 ♀⁸; Los Caracas, 1 ♀, 1 (♀); San José de Los Caracas, 1 ♀. Miranda—Santa Lucía⁸, 1 ♂, 1 ♀; Guarenas, 1 ♂; Petare, 1 (♀)⁸; Cerro Golfo Triste, 3 ♂. 1 (♀). Anzoátegui—Quebrada Bonita, Bergantín, 2 ♂, 2 ♀. Monagas—Caripe, 2 ♀, 1 (♀); Guácharo, 1 (♀)⁵; Cerro Negro, 1 ♂. Sucre—Quebrada Seca, 1 ♂⁵; Los Palmales, 1 ♀⁵; Mt. Turumiquiré³, 7 ♂, 2 ♀, 1 (♀); La Elvecia⁸, 1 ♂, 1 ♀; Cumanacoa⁸, 2 ♂, 1 ♀. COLOMBIA: La Colorada, Boyacá, 1 ♂⁸; ''Bogotá'', 2 (♀)⁵.

Xenops minutus olivaceus Aveledo and Pons.

Xenops minutus olivaceus Aveledo and Pons, *Novedades Científicas*, Contrib. Ocasion. Mus. Hist. Nat. La Salle, Ser. Zool., No. 7, p. 9, June, 1952. (Kunana, Río Negro, Perijá, Estado Zulia.)

4 ♂, 3 ♀, 6 (♀), Cerro Alto del Cedro (summit, 450 meters), Colombian Boundary.

These specimens constitute an extension of range from the Sierra de Perijá, Venezuela, to Colombia.

Seventeen additional specimens from further south in Río Socuy and Perijá are in the Phelps Collection and 3 in the Pons Collection.

Xenops rutilans perijanus Phelps and Phelps Jr.

Xenops rutilans perijanus Phelps and Phelps Jr., *Proc. Biol. Soc. Wash.*, No. 67, p. 105, June 2, 1954. (Cerro Pejochaina, Alto Río Negro, Sierra de Perijá, Zulia.)

1 (♀), Cerro Alto del Cedro (summit, 450 meters), Colombian boundary.

⁸ Specimens in Carnegie Museum.

⁹ Specimens in U. S. National Museum.

This specimen constitutes an extension of range from the Sierra de Perijá, Venezuela, to Colombia.

From Perijá, further to the south, there are 12 additional specimens in the Phelps Collection, 6 in the Pons Collection and one in the La Salle Collection.

Dysithamnus mentalis viridis Aveledo and Pons.

Dysithamnus mentalis viridis Aveledo and Pons, Novedades Científicas, Contrib. Ocasión. Mus. Nat. Hist. La Salle, Ser. Zool., No. 7, p. 13, 1952. (Cerro Jamayaujaina, Río Negro, Sierra de Perijá, Zulía.)

6 ♂, 1 ♀, 1 (?), Cerro Alto del Cedro (summit, 450 meters), Colombian boundary.

These specimens constitute an extension of range from the Sierra da Perijá, Zulía, to Colombia.

From further south, in Perijá, there are 23 additional specimens in the Phelps Collection, 16 in the La Salle Collection and 19 in the Pons Collection.

Myrmeciza immaculata brunnea, new subspecies

Type: From Barranquilla, Sierra de Perijá, Estado Zulía, Venezuela; 960 meters. No. 57616, Phelps Collection, Caracas. Adult female collected March 7, 1953, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Nearest to *M. i. immaculata* (Lafresnaye), from Colombia and Estado Lara, Venezuela, but the female differs from all races by more brownish, less rufous, upper parts; differs additionally from *M. i. berlepschi* Ridgway by more olivaceous, less chestnut, under parts. Male is not separable.

Description of type: Back and uropygium more chestnut than Chestnut Brown; crown darker brown merging into blackish of forehead; lores and sides of head blackish; an extensive postorbital bare skin area. Chin dusky; throat Dresden Brown X Prout's Brown, merging into the Cinnamon Brown X Prout's Brown of the rest of the under parts. Remiges Fuscous, outer webs uniform with back, except terminally where they are more dusky; inner tertials and upper wing-coverts uniform with back; tips of feathers on shoulders white; under wing-coverts Fuscous. Tail Fuscous-Black.

Bill (in life) "maxilla black, mandible whitish gray"; feet "black"; iris "brown"; Wing, 75 mm.; tail, 76; exposed culmen, 17; culmen from base, 22; tarsus, 32.

Remarks: Sexes different in color but similar in size. Size similar to *immaculata*. Range of measurements: five adult males—wing, 75-79 (77.8) mm.; tail, 80-80 (80); culmen from base, 23-23 (23); four adult females, including type—wing, 74-76 (75.3); tail, 70-78 (75.6); culmen from base, 21.5-23 (22.3). Measurements of *immaculata*: three adult males—wing, 79-81.5 (80.1); tail, 81-85 (83.7); culmen from base, 23-23 (23); five adult females—wing, 79-82 (80.3); tail, 71-78 (75.2); culmen from base, 21-22 (21.6).

The mandibles of the five females (in life as well as in the dried skins collected in 1950 and 1953) are grayish white, while the five females

of *immaculata* in the American Museum of Natural History, collected a long time ago, have yellowish mandibles. Lafresnay's original description of *immaculata* says "mandibula albicante."

Specimens Examined

*M. i. zeledoni*⁵.—COSTA RICA: 19. PANAMÁ: Santa Fé, Veraguas, 1 ♂, 6 ♀.

*M. i. berlepschi*⁵.—PANAMÁ: Mt. Tacarcuna, 4 ♂, 5 ♀. COLOMBIA: Baudó, Chocó, 1 ♂, 1 ♀; Alto Bonito, Antioquia, 3 ♂; Lomita Trail, Cauca, 2 ♂, 2 ♀, 3 (?); Salencia, 1 ♂; Las Lomitas, 1 ♂; San José, 2 ♂, 3 ♀; Buenavista, Nariño, 2 ♀; Barbacoas, 10 ♂, 7 ♀; Primavera, west Colombia, 1 ♀. ECUADOR: Cachabí, 4 ♂, 4 ♀; Río de Oro, 1 ♂, 3 ♀; Naranjo, 3 ♀; Mindo, 1 ♂; Santa Rosa, 1 ♀; Guala, 1 ♂; Las Piñas, 1 ♂; Bucay, 2 ♂; Chimbo, 6 ♂, 2 ♀; La Chonta, 1 ♀; San Nicolas, 2 ♀; Santo Domingo, 1 ♀.

M. i. immaculata.—COLOMBIA: La Frijolera, Antioquia, 2 ♀⁵; Honda⁵, 2 ♂, 1 ♀; Fusugasuga, 1 ♂⁵; "Bogotá," 2 [♂] cotype¹⁰, 1 [♀] cotype¹⁰, 1 [♀]¹⁰, 1 [♀]⁵; no loc., 1 [♂]¹⁰; east of Palmira, Cauca, 1 ♀⁵.

M. i. brunnea.—VENEZUELA: La Sabana, Perijá, Zulia, 2 ♂, 1 ♀; Kunana, 4 ♂; Cerro Pejochaina, 1 ♂; Barranquilla, Perijá, 5 ♂, 4 ♀.

Formicarius analis griseoventris Aveledo and Ginés

Formicarius analis griseoventris Aveledo and Ginés, Mem. Soc. Cien. Nat., La Salle, 10, No. 26, p. 69, 1950. (Kunana, Sierra de Perijá, Estado Zulia.)

11 ♂, 1 ♀, 3 (?), Cerro Alto del Cedro (summit, 450 meters), Colombian boundary.

These specimens constitute an extension of range from the Maracaibo Lake watershed to Colombia.

14 additional specimens are in the Phelps Collection from Perijá (10) and Mene Grande (1), Zulia; La Fría (2), Táchira; El Vigía (1), Mérida; and from Perijá, 6 in the La Salle Collection and 4 in the Pons Collection.

In the original description of *griseoventris*, *F. a. saturatus* Ridgway was also listed from Perijá localities but reexamination of the new large series from Cerro Alto del Cedro shows that all the Perijá specimens, as well as those from Mene Grande, El Vigía and La Fría are referable to *griseoventris*.

This new series establishes a new and much more distinctive diagnostic character, as against *saturatus*, than the one used in the original description; this new character being: *griseoventris* differs from *saturatus* in having the chestnut collar on the sides of the neck more extensive, **brighter and more prominent**. It is quite different from *F. a. virescens* Todd of Santa Marta.

Description of immature plumage. Our specimen from Mene Grande is more brownish, less olivaceous above, the chestnut collar on nape is very prominent, the chin and throat are white, the feathers faintly and narrowly edged with brownish and the abdomen is more whitish.

***Pachyrhamphus cinnamomeus badius*, new subspecies**

Type: From Burgua, Campamento Petrolero, Estado Táchira, Venezuela; 350 meters. No. 58866, Phelps Collection, Caracas. Adult male collected November 4, 1952, by Ramón Urbano. (Type on deposit at American Museum of Natural History.)

Diagnosis: Differs from *P. c. cinnamomeus* Lawrence, of Panamá to Ecuador, by darker back and uropygium, browner, less cinnamon; and from *P. c. magdalenae* Chapman, of northeastern Colombia and the Maracaibo Lake basin, differs additionally by darker crown and under parts.

Range: Known only from the type locality in southern Táchira in the extreme northwestern part of the Apure River watershed in the Orinoco valley, west of the Uribante River, distant from the Colombian border about 25 kilometers, in the Tropical Zone and at altitudes of from 200 to 500 meters.

Description of type: Crown Auburn, merging into the Brussels Brown of nape and back, which in turn merges into the Antique Brown of uropygium; lores pale buffy; ear-coverts buffy brownish. Chin white; throat and breast Cinnamon-Buff; abdomen and under tail-coverts Light Ochraceous-Buff; sides of neck, sides and flanks Cinnamon. Primaries and secondaries Fuscous, outer webs, excepting apically, Antique Brown; tertials wholly Antique Brown; inner webs of remiges Light Vinaceous-Cinnamon except apically; primary upper wing-coverts Brussels Brown tipped with dusky; rest of upper wing-coverts Brussels Brown, lighter on margins; under wing-coverts and axillaries Cinnamon-Buff. Median rectrices Brussels Brown, the others progressively paler; the outer ones Pinkish-Cinnamon.

Bill (in life) "maxilla black, mandible gray"; feet "greenish gray"; iris "dark." Wing, 78 mm.; tail, 56; exposed culmen, 13.5; culmen from base, 16; tarsus, 19.5.

Remarks: Sexes similar in color and size but the male has the second primary from the outside very short and attenuated. Size similar to *magdalenae*. Range of measurements: five adult males, including type—wing, 74-78 (76.3) mm.; tail, 56-59 (57.2); culmen from base, 14-16 (15); five adult females—wing, 74-75 (74.3); tail, 53-58 (55.4); culmen from base, 15-16 (15.7). Measurements of *magdalenae* from Calamar and Jaraquiel, Colombia: five adult males—wing, 73-77 (75.4); tail, 54-57 (54.8); culmen from base, 14.5-16 (15.2); four adult females—wing, 70.5-73 (71.9); tail, 51-55 (53); culmen from base, 15-16 (15.5).

Specimens Examined

P. c. vividior.—MEXICO: 3³. GUATEMALA: 3⁵. NICARAGUA: 10⁵. HONDURAS: 5 (inc. type)¹⁰. COSTA RICA: 8¹⁰; 16⁵.

P. c. cinnamomeus.—PANAMÁ: 27⁵; 40¹⁰. COLOMBIA: Sautata, Río Atrato⁸, 1 ♂, 1 ♀; Quibdó⁸, 2 ♂, 1 ♀; Murindo, Antioquia⁸, 2 ♂, 1 ♀; El Tambo, Chocó⁸, 1 ♀; Andagoya⁸, 1 ♂, 1 ♀; Yuntas 2 ♀⁵; Malena, 1 ♂⁵; Noanama⁵, 1 ♂, 1 ♀; Buenaventura, 1 ♂⁵; Alto Bonito, 1 ♂⁵; Bahía de Solano, 2 ♂⁵; Juntas de Tamana, 1 ♂⁵; Puerto Valdivia⁵, 2 ♂, 3 ♀; Barbacoas⁵, 4 ♂, 2 ♀, 1 (?); Honda, 1 ♀⁵; Los

¹⁰ Specimens in Museum of Comparative Zoology.

Cisneros, 1 ♂⁵; San José⁵, 2 ♂, 2 ♀; Buena Vista, 1 ♀⁵; "Bogotá"⁵, 1 [♂], 2 [♀]. ECUADOR: 18⁵.

P. c. magdalenae.—COLOMBIA: Santa Marta, 1 ♂¹⁰, 5 ♂⁸, 4 ♀⁸, 1 (?)⁸; Neshi, Antioquia, 3 ♂³; Alta Vista, 1 ♂³; Cuturú³, 2 ♂, 1 ♀; Calamar⁸, 3 ♂, 2 ♀; Jaraquiel⁸, 2 ♂, 2 ♀; Gamarra, Magdalena⁸, 1 ♂, 1 ♀; Algodonal, 1 (type)⁵; El Tambor, Santander, 1 ♂⁸; Bucaramanga, 1 ♂⁸; Cúcuta, 1 ♀³. VENEZUELA: Machiques, Perijá, Zulia, 3 ♀; San Rafael, 1 ♂, 1 (?) ; La Sabana, 1 (?) ; La Sierra, 1 ♀; Barranquilla, 1 ♂; Santa Bárbara, Zulia, 2 ♂, 3 ♀; Encontrados³, 1 ♂, 2 ♀; Mene Grande, 1 ♀; Oropé, Táchira³, 2 ♂, 1 ♀; Seboruco, 1 ♂, 1 ♀; La Fría, 5 ♂, 3 ♀, 1 (?) ; Mesa Bolívar, 1 ♂; La Azulita, Mérida⁸, 1 ♂, 1 ♀; Santa Elena⁸, 1 ♂, 3 ♀.

P. c. badius.—VENEZUELA: Burgua, Táchira, 8 ♂, 6 ♀, 3 (?) .

Piprites chloris perijanus Phelps and Phelps Jr.

Piprites chloris perijanus Phelps and Phelps Jr., Proc. Biol. Soc. Wash., 62, p. 187, Dec. 22, 1949. (La Sabana, Río Negro, Perijá, Zulia.)

3 ♂, 2 ♀, 1 (?) , Cerro Alto del Cedro (summit, 450 meters), Colombian boundary.

These specimens constitute an extension of range from the Sierra de Perijá, Venezuela, to Colombia.

After this race was described, on two males from Perijá, eight more specimens have been collected in Perijá besides the above six from further north. This additional material shows that *perijanus* is nearest to *P. c. antioquiae* Chapman from which it differs by a darker back.

Lophotriccus pileatus santaluciaae Todd

Lophotriccus pileatus santaluciaae Todd, Ann. Carnegie Mus., 32, p. 299, Feb. 15, 1952. (Santa Lucía, Miranda, Venezuela.)

6 ♂, 5 (?) , Cerro Alto del Cedro (summit, 450 meters), Colombian boundary.

These specimens constitute an extension of range from northern Venezuela to Colombia.

This race is represented by 29 specimens in the Phelps Collection, 5 in the La Salle Collection and 14 in the Pons Collection; also by the 8 paratypes in the Carnegie Museum. Apparently no form of *L. pileatus* has been previously reported from northern Colombia.

Pipromorpha oleaginea abdominalis, new subspecies

Type: From Los Caracas, Distrito Federal, Venezuela; near sea level. No. 18148, Phelps Collection, Caracas. Adult [male] collected April 28, 1942, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from all Venezuelan races of *oleaginea* by duller, paler buffy brown abdomen, less yellowish or ochraceous. In color it is nearest to *P. o. dorsalis* Phelps and Phelps Jr., of the Subtropical Zone of Mt. Roraima, from which it differs additionally by lighter olive upper parts, with more of a yellowish tinge. The male differs additionally from *P. o. chloronota* (D'Orbigny and Lafresnaye), *P. o. parca* (Bangs), *P. o. intensa* Zimmer and Phelps and *P. o. pallidiventris* (Hell-

mayr) by darker upper parts, and from the first three by having the outer primaries attenuated and notched.

Range: Known from the Caracas region on the coast at sea level and on the interior range of mountains in the Tropical Zone at 600 and 700 meters.

Description of type: Head, nape, back and upper rump nearest Dull Citrine, this merging into the Buffy Citrine of lower rump and upper tail-coverts. Chin grayish citrine merging into the Buffy Citrine of breast and then into the near Isabella of abdomen, flanks and under tail-coverts. Wings Benzo Brown; outer webs of primaries and secondaries narrowly edged with grayish olive except apically; inner tertials strongly edged externally and apically with yellowish white; primary coverts Benzo Brown; greater wing-coverts margined with buffy olive forming two poorly defined wing bars; bend of wing buffy; under wing-coverts and axillaries Ochraceous-Buff. Tail lighter than Benzo Brown, paler on under surface; rectrices margined externally with Dull Citrine and very faintly and narrowly tipped with buffy white.

Bill (in life) "black, base of mandible cream"; feet "dark"; iris "brown." Wing, 61 mm.; tail, 44; exposed culmen, 11; culmen from base, 13; tarsus, 15.

Remarks: Sexes alike in color but male has attenuated, notched, outer primaries, and longer wing. Range of measurements: two adult males, including the type—wing, 61-61 (61) mm.; tail, 43-44 (43.5); culmen from base, 13-13.5 (13.2); one adult female—wing, 56; tail, 41; culmen from base, 13.5; one specimen of undetermined sex, but probably a female because of wing length—wing, 57; tail, 42; culmen from base, 13.

It would appear that the males of the new race have a shorter tail than the other Venezuelan races but the shortness of the series of *abdominalis* prohibits its use in diagnosis. Five adult males of each of these subspecies show these tail measurements: *chloronota* 44-47 (46.5); *intensa*, 48.5-50 (49.3); *pallidiventris*, 49-51 (50); *parca*, 44-49 (46.8).

Todd¹¹, commenting on the generic characters, says "... the outer primaries in many individuals are more or less narrowed terminally, or even distinctly emarginate . . . , the precise character and extent of this modification varying greatly." Our considerable series of four of the six Venezuelan races show that the attenuated and notched outer primaries do have not only a sexual significance but a subspecific one also, at least in Venezuela.

intensa (38 skins). Of the 18 sexed males, only 2 have the attenuated primaries. One of these is from Paruima Mission, Kamarang River, British Guiana, and the other from Carabobo, Cuyuni River, near the British Guiana frontier. Inasmuch as the British Guiana subspecies, *P. o. wallacei* Chubb, has attenuated primaries, perhaps our two specimens are intermediates with that subspecies.

chloronota (58 skins). None shows attenuated primaries, nor do any of the 98 skins in the American Museum of Natural History.

parca (50 skins). None shows attenuated primaries.

pallidiventris (53 skins). All of the 19 specimens sexed as males have

¹¹ Studies in the Tyrannidae. I. A revision of the Genus *Pipromorpha*. Proc. Biol. Soc. Wash., 34, p. 175, Dec. 21, 1921.

attenuated primaries and none of them sexed as females has them.

dorsalis (unique type). Not sexed.

abdominalis (4 skins). The two males have attenuated primaries, the sexed female has the outer primaries in moult and the unsexed one has them intermediate.

From the above we can deduce that the attenuated primaries in the Venezuelan races are a sexual character and that it can be used in the diagnosis of subspecies inasmuch as it is lacking entirely in *chloronota* and *parca* and almost so in *intensa*, while it is always present in *pallidiventris* and in *abdominalis*.

Specimens Examined

P. o. oleaginea.—BRAZIL: 1¹².

P. o. chloronota.—BOLIVIA: 3¹². BRAZIL: Rio Castanho, 1 ♂; 42¹². COLOMBIA: 13¹². VENEZUELA: 44¹³; 40¹⁴; Las Bonitas, Apure, 3 ♂, 1 (♀); Burgua, Táchira, 1 ♂, 2 ♀, 1 (♀).

*P. o. hauxwelli*¹².—ECUADOR: 28. PERÚ: 10.

P. o. maynana.—PERÚ: 19¹².

P. o. pacifica.—ECUADOR: 17¹².

*P. o. wallacei*¹².—BRAZIL: 46. FRENCH GUIANA: 2. DUTCH GUIANA: 8. BRITISH GUIANA: 6.

P. o. dorsalis.—VENEZUELA: Cerro Roraima, 1 (♀), type.

P. o. intensa.—VENEZUELA: 30¹⁴. BRITISH GUIANA: Paruima Mission, 1 ♀.

P. o. pallidiventris.—VENEZUELA: 28¹²; 21¹⁴; Cerro Corona, Sucre, 1 ♂, 1 ♀; Cerro Papelón, 2 ♂, 1 ♀, 8 (♀).

P. o. abdominalis.—VENEZUELA: Cerro Negro, Miranda, 1 ♂, 1 [♀]; Los Caracas, Dto. Federal, 1 [♂] type, 1 ♀.

P. o. parca.—VENEZUELA: 12¹⁴; Kunana, Perijá, 3 (♀); Barranquilla, 1 ♂; Cerro Alto del Cedro, Zulia, 4 ♂, 4 ♀, 7 (♀). COLOMBIA: 40¹². PANAMÁ: 13¹².

P. o. lutescens.—PANAMÁ: 27¹².

P. o. dyskola.—PANAMÁ: 24¹².

*P. o. assimilis*¹².—COSTA RICA: 10. NICARAGUA: 14. GUATEMALA: 53. MEXICO: 4.

Tangara xanthogaster exsul (Berlepsch)

Euphonia ruficeps exsul Berlepsch, Verh. 5th Intern. Orn. Kongr. Berlin, pp. 1017, 1127, 1912. (San Esteban, Venezuela.)

1 (♀), Cerro Alto del Cedro (Hato La Esperanza, 50 meters), Colombian boundary.

This specimen constitutes an extension of range from Venezuela to Colombia. It had been known only from northern Venezuela.

The following specimens in the Phelps Collection are from localities close to the Colombian boundary:

3 ♂, 2 ♀, Cerro Pejochaina, upper Río Negro, Perijá.

¹² Specimens in American Museum of Natural History. For list of specimens and localities, see Zimmer, Am. Mus. Nov., No. 1126, pp. 13, 14, 1941.

¹³ idem. For list of specimens and localities, see Zimmer and Phelps, Am. Mus. Nov., No. 1312, p. 17, 1946.

¹⁴ For list of specimens and localities, see Phelps and Phelps Jr., Proc. Biol. Soc. Wash., 65, p. 50, 1952.

1 ♂, 3 ♀, 1 (♀), Burgua, Táchira.

The La Salle Collection also has nine specimens from Perijá and the Pons Collection two.

Rhodinocichla rosea beebei Phelps and Phelps Jr.

Rhodinocichla rosea beebei Phelps and Phelps Jr., Proc. Biol. Soc. Wash., 62, p. 191, Dec. 22, 1949. (La Sabana, Río Negro, Perijá, Zulia.)

1 ♂, 1 ♀, Cerro Alto del Cedro (summit, 450 meters), Colombian boundary.

The above specimens constitute an extension of range from the Sierra de Perijá, Venezuela, to Colombia.

After this race was described, on six specimens in the Phelps, Pons and La Salle collections, 42 additional specimens from Perijá have entered these three collections.

Chlorospingus canigularis canigularis (Lafresnaye)

Tachyphonus canigularis Lafresnaye, Rev. Zool., 11, p. 11, 1848. (Bogotá.)

1 ♂, 1 ♀, Cerro El Teteo, Burgua, Táchira.

These specimens constitute an extension of range of the species from the western slopes of the eastern Andes of Colombia to Venezuela, in the Subtropical Zone at 1250 meters.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THRIPS ILLICII, A PROPOSED EMENDATION
(Thysanoptera; Thripidae)

J. DOUGLAS HOOD

Thrips alysi Hood was described in the Proceedings of the Biological Society of Washington, 67:278 (December 28, 1954), from the flowers of a plant which the collector's label showed to be *Alysium floridana*. There is no plant of that name.

It turns out that the determination of the plant was supplied orally to the collector, and that he, familiar with Sweet Alyssum and not knowing *Illicium floridanum* Ellis (the Florida Anisetree or Polecat Tree), quite understandingly erred in recording the name of the plant.

My hope is that the prompt emendation of the specific name of the thrips, before it has become established in the scientific literature, will incline the International Commission on Zoological Nomenclature, acting under its plenary powers when the case is submitted to them, to make a special exception which will permit the use of *Thrips illici* for the species.

MAY 20 1955



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF CINARA FROM OREGON
(APHIDAE)

BY F. C. HOTTES AND E. O. ESSIG

Mr. L. G. Gentner, who has added several new Aphid records to the Aphid fauna of Oregon, collected the new species described herewith.

Cinara setulosa n. sp.

Apterous viviparous female.

Size and general color.—Length from vertex to end of anal plate varying from 4.50-5.00 mm. We have no information relative to the color of living specimens. The color is described from cleared mounted specimens. Head and thorax brown, abdomen light tan, cornicles, transverse pigmented spot, cauda and anal plate brown, only slightly darker than abdomen. First and second antennal segments concolorous with head, or but little darker. Third, fourth and fifth antennal segments pale dusky at base becoming darker at apex. Sixth antennal segment mostly dusky, only pale at extreme base. All femora brown, with prothoracic femora darker than femora of meso and metathorax, and with a dark ridge which may be almost black along the dorsum. Tibiae dark brown, with apical regions almost black. Tarsi concolorous with ends of tibiae. Pro and mesothoracic tibiae darker than tibiae of metathorax.

Head and thorax.—Antennal segments with the following lengths: III .47-.55 mm., IV .20-.25 mm., V .23 mm., VI .17-.20 + .05 mm. There are no secondary sensoria present on any of the segments, only the fifth has a large wide rimmed primary sensorium. Antennal hairs sparse, hairs on third segment mixed as to type and length. The shortest hair which are also the finest, are only two thirds the width of the segment in length, or about .03 mm. the longest, darkest and most spine-like hairs are about .06 mm. long. Antennal hairs quite upstanding. The longest hair on the antennae are found on the fourth and fifth segments, there are quite spine-like, but sparse, these segments also have quite short hairs. Rostrum with segments three, four and five extending beyond metathoracic coxae. Last three segments of the rostrum with the following lengths: .28, .26, .10 mm. Median suture of head poorly developed, as a rule failing to reach posterior margin of head.

Dorsum of head with a moderate number of hairs, varying from fine to spine-like, and from .03 mm. or less to about .06 mm., the spine-like hairs being longest. The hairs on the dorsum of the head do not reach the posterior margin of the head. Eyes large, closely applied to pale, with almost no stalk. Ocular tubercles prominent, but small. Anterior dorsum of head with surface wrinkled but not setulose. The hind femora vary from 1.50-1.86 mm. in length. Hairs on all femora short, thick and

spine-like, much like those on outer margin of tibiae. Some hairs on the femora are much finer and only half as long as others, these are few in number, some hairs are spine-like, but only one third, or one fourth as long as others. These tack-like hairs are few in number, and are located for the most part on the ventral surface of the femora. All tibiae have the hairs on the inner margin finer and paler than the hairs on the outer margin. On the outer margin the hairs vary from heavy spine-like, dark upstanding hairs, which are subequal to the width of the segment, the ratio of length to width being .07-.10 mm. to hairs only .03 mm. in length. The two types of hairs being intermixed. The hairs on the outer margin of the tibiae are fewer in number than on the inner margin. The hind tibiae vary in length from 2.07-2.43 mm. The hind tarsal segments have the following lengths: .16, .55-.65 mm. The first tarsal segment has about twenty hairs, these are located on the apical two thirds of the segment. The hairs on the ventral surface of the second segment are finer, shorter and more numerous than the hairs on the dorsal surface of the segment. The dorsal surface of the pro and mesothorax are smooth. The surface of the metathorax is so finely setulose that this condition has to be looked for. The mesosternal tubercle is absent.

Abdomen.—Both dorsal and ventral surfaces of the abdomen are characterized by a setulose condition which is well developed, and even better developed in the posterior regions. This condition is without pattern on the dorsal surface. On the ventral surface the setulose condition is arranged in rows which anastomose repeatedly giving this surface a lace-like appearance. Hairs similar on both ventral and dorsal surfaces, all arising from small pigmented spots, but little wider than the base of the hairs. Hairs on the abdomen variable in length, varying from short tack-like hairs to hairs about .09 mm. in length. Anterior to the transverse pigmented spot which is not divided, but indented in the mid region of both the anterior and posterior margins, there are a number of small irregular spots each giving rise to a single hair, such hairs are either short or long. These small pigmented spots have a smooth surface. The surface of the transverse pigmented spot is setulose, the setulose condition being arranged in rows. Hairs on this spot are not numerous, but extend to almost the middle of the spot, they are not arranged in rows. Cauda and anal plate setulose, both provided with long, very fine sharp-pointed hairs. Surface of cornicles smooth, base quite irregular, varying from .30-.40 mm. with the opening forward of center. Surface of cornicles provided with a few spine-like hairs, confined largely to the outer region, and short fine hairs, confined largely to the constricted region of the cornicle, but intermixed with the more spine-like type. Some of the finer hairs on the cornicles are extremely short.

This species has no near allies. It is the only known species described from *Abies* with the setulose condition so well developed, and with various types of hairs on the abdomen and legs. *C. glabra* G&P has much the same setulose condition, but this species has a large smooth patch on the dorsum of the abdomen, and the cornicles are smaller, and the genital plate has more depth. It is taken on pine.

Holotype apterous viviparous female. Taken on *Abies magnifica* var.

shastensis. Mt. Ashland, Oregon, Sept. 2, 1954 by L. G. Genter. Deposited in the collection of E. O. Essig.

Eulachnus brevipilosus CB.

This very distinctive species is being recorded for the first time from the United States. As indicated by the name, the hair are very short. On the body they might best be described as minute. On the hind tibiae the hair are not only short but enlarged at the tip, only the vertex and dorsum of the head have hair of normal length.

Apterous viviparous females, taken on *Pinus* sp. Seattle, Washington, Oct. 14, 1954. M. J. Forsell, collector.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF *CINARA* FROM ARIZONA
(APHIDAE)

BY F. C. HOTTES AND GEORGE D. BUTLER, JR.

The description of this new species from Arizona adds another species to those known from the host, *Pinus edulis*.

Cinara apachea n. sp.

Alate viviparous female.

Size and general color.—Length from vertex to end of anal plate varying from 2.14-2.86 mm. Most specimens reach the upper limit in size. Color in life not recorded, but remembered as uniform dark brown and shining, and is so indicated by the mounted material, only the mounted material is somewhat darker than the shade recalled. First and second antennal segment blackish, third, fourth and fifth antennal segments with basal portions yellowish, and apical portions black, the black on segments four and five being equal to about half of segment. Sixth antennal segment uniform black. Thoracic lobes black. Femora yellowish at extreme base, shading to brown which continues to end in the pro and mesothoracic femora, the metathoracic femora quickly become black, following the yellowish base. Pro and mesothoracic tibiae strongly banded with yellow, otherwise brownish-black. Metathoracic tibiae with yellow band indistinct, the yellow being intermixed with dusky, and the band not complete. Cornicles dark dusky brown.

Head and thorax.—Antennal segments with the following lengths: III .45-.50 mm., IV .21-.25 mm., V .21-.25 mm., VI .10-.13 + .04 mm. All antennal segments with primary sensoria. Secondary sensoria distributed as follows: III three to four, IV one, two or three, most common number two, three sensoria present in only one case, V one. Hair on antennae sparse about .03 mm. in length or slightly less, spine-like, set at an angle of about 45 degrees. On the third antennal segment the shortest hair are found near the base of the segment and the longest near the apex, all hair are shorter than one half the width of the segment. Secondary sensoria large, only slightly tuberculate and with narrow rims. Long hair on sixth antennal segment not extending beyond origin of marginal sensoria. Dorsum and vertex of head provided with a moderate number of rather spine-like hairs, which are only slightly longer than those on the third antennal segment. Median suture of head with a row of hair on either side. All femora provided with short spine-like hair, similar to those on the head and antennae and no longer. Hind tibiae varying from 2.65-2.93 mm. in length, provided with extra numerous hairs which are about .03 mm. in length. These hairs are set at an angle of about 45 degrees, but are more inclined from middle to apex. The tibial hair are rather heavy near base, but become extremely



fine towards the apex. The hair are similar on the outer and inner margins of the tibiae. First segment of hind tarsis .10 mm. in length, on the ventral surface there are about ten hairs. The second segment of the hind tarsis is about .26 mm. long, this segment has a few hairs which are alike on both the ventral and dorsal surfaces. Wings with a uniform smoky color, and a scale-like surface. The second fork of the media closer to the margin of the wing than to the first. Rostrum as a rule with segments three, four and five extending beyond metathoracic coxae. Last three segments of the rostrum with the following lengths: .185, .15, .071 mm.

Abdomen.—Cornicles with basal margin very irregular, and the opening acentric, being closer to the posterior margin. Hairs on cornicles extremely sparse and varying from .03 to .05 mm. in length. The hairs near the margin are few in number, very short and stubby and rather coarse. Hair on dorsum of abdomen very sparse, about .03 mm. in length. Hair on ventral surface of abdomen of normal length, and numerous. Pigmented spots anterior to cauda divided, hair on these confined to posterior margin and very coarse and spine-like; from .03 to .05 mm. in length. Genital plate setulose with few hairs and these confined largely to the ends of the plate.

Apterous viviparous female.

Length from vertex to end of anal plate varying from 2.93-3.00 mm. Color much like alate viviparous female. Hair on antennae, abdomen and legs similar to that on alate viviparous female. The hair on the femora are also short, and similar to those of the alate. Antennal segments with the following lengths: III .47-.50 mm., IV .17-.18 mm., V .21-.24 mm., VI .13 + .04 mm. All antennal segments have primary sensoria. Secondary sensoria distributed as follows: III none, IV none, V one. Last three segments of the rostrum with the following lengths: .21, .18, .06 mm. Mesosternal tubercle present, but very small. Hind tibiae varying in length from 2.43-2.65 mm. Hind tarsal segments .10 + .21-.26 mm.

Holotype alate viviparous female, Morphotype apterous viviparous female. Host, *Pinus edulis*. Taken at Springerville, Arizona, June 11, 1954. Both types deposited in the United States National Museum.

This species may not be keyed beyond couplet ten in Palmer's "Aphids of the Rocky Mountain Region" because hind tarsal II hardly equals one-tenth the length of the hind tibiae. It is not *C. curvipes*. Nor is the second segment of the tarsis distinctly shorter than one-tenth of the hind tibiae. It is not *C. arizonica*. Nor can the second segment of the hind tarsis be said to be one-tenth or more the length of the hind tibiae. Specimens of *C. apachea* are perhaps most likely to be taken for specimens of *C. schwarzii* (W). They differ from this species as follows: more, and shorter hair on the hind tibiae. The tibial hair are also somewhat curved. Short hair on the hind femora, shorter tarsi, shorter terminal segments of the rostrum, shorter and more spine-like hair on antennae and dorsum of abdomen.

Immature specimens of this species may have been taken at Grand Canyon National Park, but they did not survive the high temperatures to which they were subjected on the return trip to Colorado.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

CINARA DESCRIPTIONS. (APHIDAE)

By F. C. HOTTES

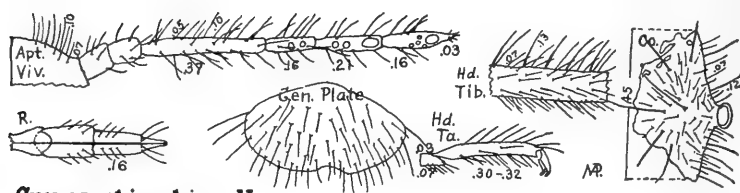
The Aphids described herewith were collected in 1954.

Cinara chinookiana n. sp.

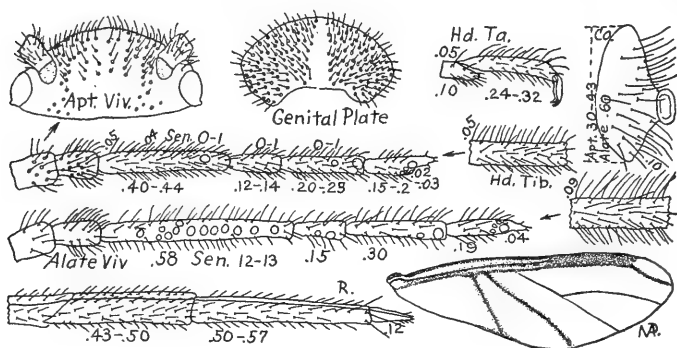
Apterous viviparous female.

Size and color.—Length from vertex to end of anal plate varying from 3.29-3.50 mm. Color in life not recorded, specimens in alcohol with head and thorax dark brown. Legs dark brown with ends of tibiae and tarsi black or blackish-brown. Abdomen rather pale except for brownish-black cornicles, four rows of wax pore plates and large block shaped pigmented spots anterior to the cauda, which are dark brown. Mounted specimens show the first two segments of the antennae colorous with the head, segments three, four and five have the apical portions of the segments darker, the sixth segment is dark and uniform in color. The thorax has six large dark brownish block shaped areas on the dorsum, these are arranged in two rows, and it is them that gives the dark color to the thorax.

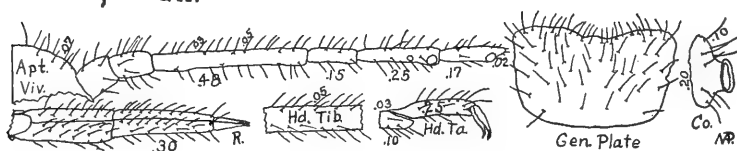
Head and thorax.—Antennal segments with the following lengths: III .34-.347 mm., IV .143-.157 mm., V .185-.214 mm., VI .143-.171 + .028-.042 mm. Secondary sensoria arranged as follows: III with neither primary or secondary sensoria, IV with primary present, secondary sensoria as a rule absent but one may be present, V primary present, secondary one or two, as a rule one. Primary sensoria on segments five and six large, and apparently with rim poorly developed. Primary sensorium on four not differentiated from secondary except by position. Antennal hair not numerous, that on the third segment consisting of a long upstanding type which is rather coarse, and a shorter, finer type which is more inclined. Hair on first antennal segment very sparse, limited to area near apex of segment. Hairs at extreme base of third and fifth segments very short and extremely fine, this is not true of the hairs near the base of the fourth segment. Long hairs on sixth segment not extending beyond origin of marginal sensoria, hence roughly confined to basal half of segment. Rostrum almost reaching end of metathoracic coxae. Last three segments of the rostrum with the following lengths: .16, .157, .057 mm. Ocular tubercles poorly developed. Anterior margin of head arched, median suture present as a fine dark line, which does not reach posterior region of head. Mesosternal tubercle absent. Length of hind tibiae varying from 1.33-1.36 mm., hence rather short. Hair on inner and outer margins of hind tibiae unlike. That on inner margin, finer and shorter than that on outer and less upstanding, and with exceptions, shorter than width of segment, or subequal to width. Hair on this margin near apex of tibiae very numerous, much more inclined and only half as long as that, more basal. Hair on outer margin of tibiae of three types, a spine-like type, set at an angle of about



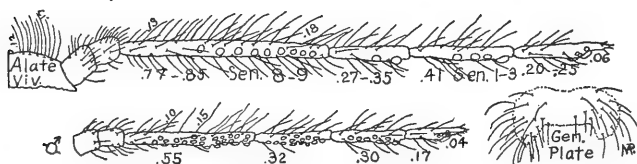
CINARA chinookiana H.



CINARA puerca H.



CINARA tanneri K



CINARA lasiocarpae (G&P)

90 degrees, and about .145 mm. in length. These hairs are not numerous and are spaced from one another at a distance of about their length, or slightly less, the second type of hair is only about half as long as the first, much finer and is set at an angle of about forty-five degrees, the third type of hair is shorter than the second and more inclined; it is not numerous. Hind tarsal segments with the following lengths: .085, .27-.30 mm. The first tarsal segment is somewhat recessed within the end of the tibia, its ventral surface has about nine hairs on its apical two thirds. Hairs on dorsal surface of second tarsal segment much longer, more spine-like, and fewer than those on ventral surface.

Abdomen.—Dorsum of abdomen with numerous dark hairs, these are of two types. A long coarse type, which is dark in color and about .143 mm. in length, and a type only half as long, which is finer in texture and less dark. Both types arise from small pigmented spots. Cornicles with base varying from .37-.45 mm. the outer margin is very irregular. Cornicles with two types of hair, a coarse type restricted in number and confined to outer margin of cornicle for the most part, and a finer type confined more or less to the restricted region of the cornicle, but intermixed with the coarser type. These hairs are numerous. Pigmented spots anterior to cauda large, block shaped, with very irregular margins. Hair on these spots not confined to rows, but scattered on apical half. Cauda and anal plate with two types of hairs which are numerous. Genital plate setulose with numerous long and short hair.

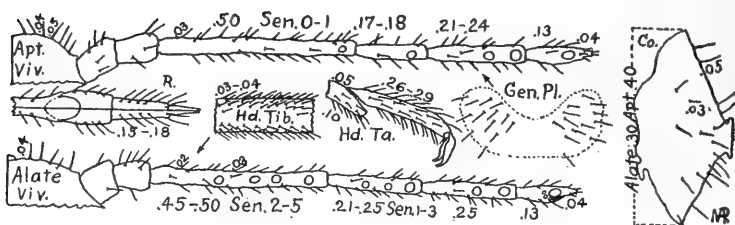
Holotype apterous viviparous female. Deposited in the United States National Museum. Host *Abies lasiocarpa*. Lake Tipsoo, near summit Chinook Pass, Washington. Carl Johansen.

This species does not key satisfactorily in Palmer's key to the genus *Cinara* in "Aphids of the Rocky Mountain Region" and is definitely not included in her book. It differs from *C. lasiocarpae* (G&P) in the absence of pigmented spots on the dorsum of the abdomen, the shorter hair on antennae and legs, the much shorter tibiae, and the larger more block shaped pigmented spots anterior to the cauda. From *C. alacra* H&E it differs in color of tibiae, hair on antennae and legs, and in sensoria.

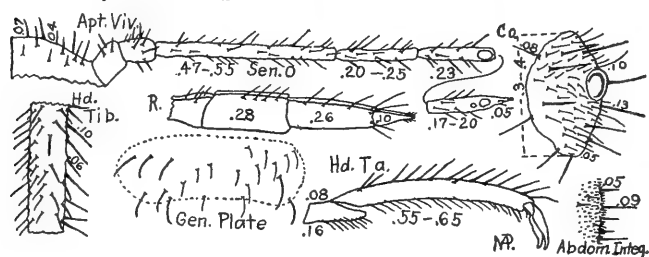
Cinara puerca Hottes

Alate viviparous female.

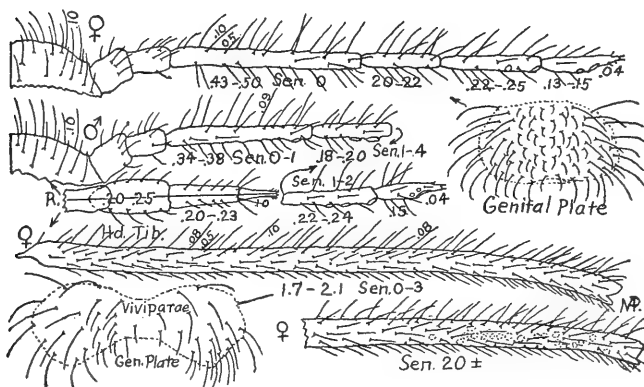
Length from vertex to end of anal plate 3.86 mm. Color similar to that of apterous viviparous female in all respects, and like that form free from all powder. Length of antennal segments as follows: III .57 mm., IV .16 mm., V .26 mm., VI .16 + .028. Sensoria distributed as follows: III, 13 arranged in a more or less straight row except for two smaller tuberculate sensoria. All sensoria with narrow rims. Presence of primary sensorium questioned, if present similar to secondary sensoria and counted as such. IV 1-2 no distinction made between primary and secondary sensoria. V one small secondary sensoria and large primary. Marginal sensoria on VI far removed from primary and arranged in a row, the primary sensorium on this segment is very tuberculate. Hair on first two antennal segments numerous. Hair on third segment numerous and upstanding, the longest hairs on this segment are shorter than the width of the segment. Hair on the fourth and fifth segments less numerous than on the third segment and less upstanding. Eyes as in



CINARA apacheca H&B.



CINARA setulosa H&E.

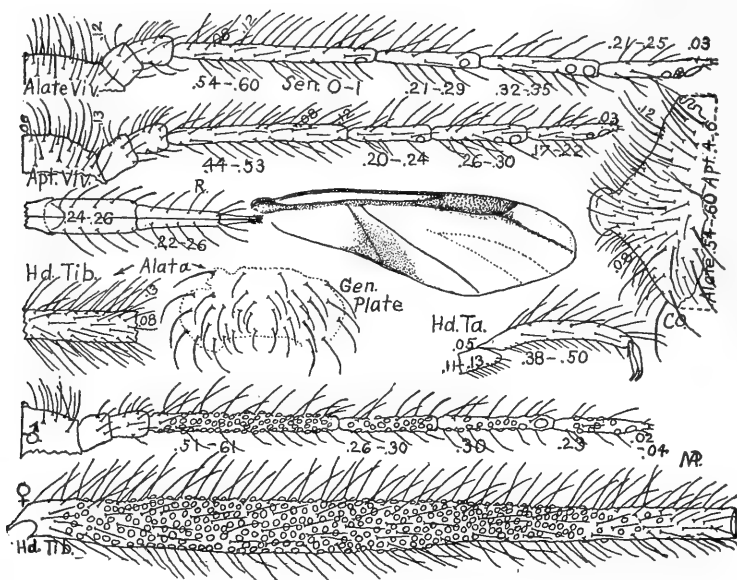


CINARA hottesi (G&P)

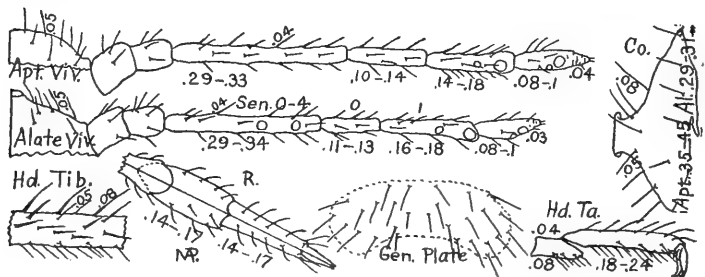
apterous viviparous female, ocular tubercles present but very small. Median suture of head rather narrow, with a short pigmented stripe on either side. Posterior half of head almost free from hair, the few present being no longer than the white area from which they arise, and very difficult to see. Anterior margin of head and anterior dorsum with a moderate number of normal hair. Lateral lobes of thorax with few hairs, these are largely confined to the central portion of the lobes, and are indicated by white areas around their base. Median posterior lobe of thorax, with hair indicated by white clear areas confined to ends of lobe, these hairs are few in number. Stigma dark smoky with a scale-like surface, provided with a few clear areas. End of stigma blunt. Radial sector short, heavy, slightly bent, bordered with smoky. Area of wing in region of end of radial sector rather narrow. Media very faint, once branched, the branch far removed from the margin of the wing. Anal and cubital veins very well developed, heavy, both strongly bordered with smoky, the anal vein ending in a small smoky area. Hind wing more or less smoky. Hind femora 1.43 mm. in length, slightly narrowed before slight bend near basal end. Hind tibiae 2.37 mm. in length. Hair on hind tibiae numerous and upstanding, fine, about as long as width of tibiae, but no longer. First tarsal segment about .11 mm. long, provided with about twenty hairs, but these are not all ventral. The second tarsal segment is .29 mm. in length, it has numerous fine hairs on all surfaces. Dorsum of abdomen with hairs similar to those of apterous viviparous female. Ventral surface of abdomen with numerous long hair. Cornicles with base measuring about .60 mm. Hair on cornicles confined largely to constricted area and surface immediately adjacent. There are a few hairs similar to those on the dorsum of the abdomen on the outer half of the base of the cornicles, they are indicated by clear areas at their base. Pigmented areas anterior to cauda block-like, provided with a row of long hairs on their posterior margins. Hair on cauda confined to posterior half. Genital plate crescent shaped, with mid region free from hair.

Morphotype described from a single specimen, reared on branch of *Pinus edulis*, Grand Junction, Colorado, Dec. 29, 1954. Deposited in the United States National Museum. Specimens of this species were still active in nature Nov. 24, 1954, and still viviparous. I suspect they were still active Dec. 11th although I could not locate them, ants so indicated, their presence.

Despite efforts to induce the production of sexual forms, by subjecting specimens being reared to cold and prolonged darkness, without knowing that either of these factors induce the production of sexual forms, specimens were still viviparous March 7, 1955. I can now add some information regarding the life habits of this species. One large colony living near the origin of a branch was completely covered over by a shed made of clay-like material, constructed by ants. There were two small openings, only large enough for the coming and going of the ants, far too small to permit the escape of adult aphids. Within this shed there were many aphids, and much honey dew, in fact the honey dew was so abundant that some dead aphids were preserved in it. Another colony living in a fissure of trunk bark, was encased by a clay bottle-shaped structure made by ants, this also had two small openings.



CINARA nimbata H.



CINARA nitidula H.

Within this there was much honey dew, a few live aphids and some dead aphids preserved in the liquid.

Cinara cognita Hottes and Essig

Alate viviparous female.

Length from vertex to end of anal plate varying from 2.44-3.29 mm. Color in life not known. Length of antennal segments as follows: III .40 mm., IV .17 mm., V .20 mm., VI .12 + .04 mm. Secondary sensoria distributed as follows: III 2-3, primary sensorium present. IV 0-1, primary sensorium present. V 1, primary sensorium present. Longest hair on third antennal segment about as long as width of segment, fine, sparse, upstanding. Long hair on sixth antennal segment confined to region basal to marginal sensoria. Last three segments of the rostrum with the following lengths: .185, .16, .07 mm. Last three segments of the rostrum extending beyond the metathoracic coxae. Media twice branched, second branch closer to the first than to the margin of the wing. All veins lightly bordered with dusky. Hair on lateral lobes of thorax confined largely to the median region of the lobes, absent on more lateral portions. Median posterior lobe of thorax with very few hairs, these confined to central region. Hind femora 1.07 mm. in length. Hind tibiae 1.86 mm. long. Hind tarsal segments not in condition to measure. Outer margin of cornicle base very irregular, about .25-.31 mm. across. Hairs on cornicles confined largely to constricted area, opening of cornicles acentric within base, which may have one or two clear areas. Pigmented spots anterior to cauda widely separated, provided with a row of long hairs on the posterior margin. Hair on dorsum of abdomen exceedingly sparse, confined roughly to transverse rows which are far apart, the individual hairs being spaced from one another by a distance about equal to their length. Hair on ventral surface of abdomen normal. Hair on cauda confined to posterior margin, remainder of cauda faintly setulose. Genital plate with three to four hairs.

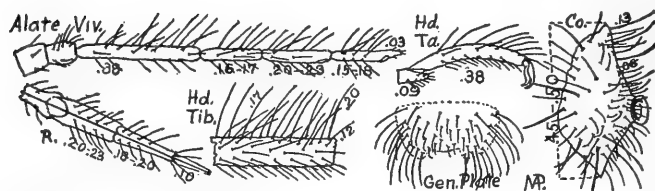
Morphotype alate viviparous female, collected on *Juniperus communis* Tundo State Park, Washington. June 23, 1954. The material was sent in by Prof. Carl Johanson, of Pullman, Washington.

Cinara lasiocarpae (Gillette and Palmer)

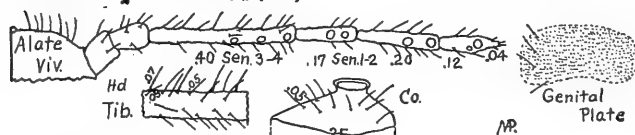
Alate male.

Length from vertex to end of anal plate 2.71 mm. Head dusky black. Thorax dusky brown. Abdomen dusky green with no spots. Cornicles black. Antennae dusky. Femora yellowish at base remainder of femora dusky. Tibiae dusky, with region near base more or less yellowish.

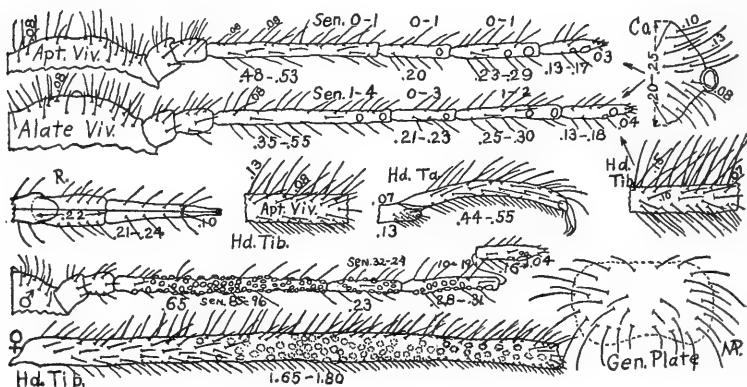
Head and thorax.—Length of antennal segments as follows: III .53 mm., IV .29 mm., V .27 mm., VI .17 + .028 mm. Sensoria distributed as follows: III 48-51, primary sensorium present, like secondary. IV 17, primary sensorium present. V 15, primary present. VI 1. All secondary sensoria small, irregularly arranged and very tuberculate. Hair on antennae about .1 mm. in length, fine, set at an angle of about 45 degrees on third segment, and slightly more on fourth and fifth segments. Rostrum with segments three, four, and five extending beyond metathoracic coxae. Length of last three segments of the rostrum as follows: .24, .185, .085 mm. Media with two forks, second fork closer to



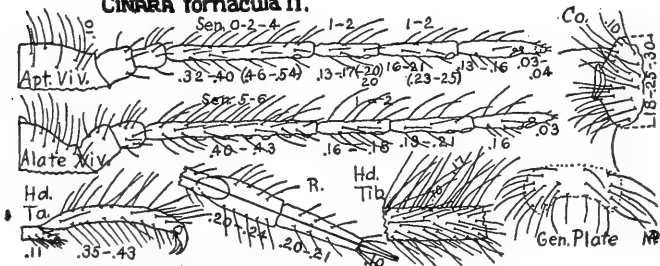
***CINARA engelmanniensis* (G&P)**



***CINARA cognita* H&E.**



***CINARA fornacula* H.**



***CINARA pilicornis* (H).**

margin of wing than to first fork. Radial sector and anal vein bordered. Hind tibiae 2.06 mm. in length. Hair on outer margins of hind tibiae .185 mm. in length. Hair on inner margin of hind tibiae much shorter, and less upstanding. First segment of hind tarsis .1 mm. in length, length of second segment of hind tarsis .347 mm. Ventral surface of first tarsal segment with about 15 hairs.

Abdomen.—Cornicle with base measuring about .24 mm. Harpagons blunt free. Dorsal and ventral surfaces of abdomen with numerous hairs.

Allotype alate male. Reared on branch of *Abies lasiocarpa* Sept. 18, 1954. Deposited in the Collection of the United States National Museum. The specimen described herewith was one of two immature males taken with oviparous females south of Glade Park, Colorado, Sept. 12, 1954. Apparently my rearing methods did not quite satisfy the other male specimen, he wandered off, just as he should have become an adult. Had I not taken the male described here as an immature specimen, associated with females, I would hardly associate him with *C. lasiocarpae*. This is the last form of this species to be described.

Cinara hottesi (Gillette and Palmer)

Apterous male.

Length from vertex to end of anal plate varying from 1.93-2.35 mm. Head, thorax and abdomen bluish-black without pulverulence. First and second antennal segments blackish, remaining antennal segments dusky yellow with apical portions dusky. Femora yellowish except for extreme apex which is brownish. Tibiae yellowish becoming light dusky near middle, the dusky growing darker towards the apex. Tarsi dusky. Cornicles black. Dorsum of abdomen with four rows of small wax pore plates.

Head and thorax.—Median suture of head very narrow, not much if any darker than head. Length of antennal segments as follows: III .33-.35 mm., IV .16-.185 mm., V .21-.23 mm., .10-.13 + .42-.057 mm. Secondary sensoria conspicuously few for a male Aphid. Third antennal segment with neither secondary or primary sensoria. Fourth antennal segment with from zero to four secondary sensoria, as a rule none or one. Primary sensorium present on fourth. Fifth antennal segment with from one to three secondary sensoria, as a rule only one, primary sensorium present. Hair on antennal segments, sparse, upstanding about .085 mm. in length. Rostrum longer than the body, the third, fourth and fifth segments extending beyond the abdomen. Last three segments of the rostrum with the following lengths: .26, .18, .085 mm. Hind tibiae varying from 1.43-1.50 mm. in length. Hind tarsal segments with the following lengths: .071-.085 mm., .228-.26 mm. Hair on outer margin of hind tibiae much longer than that on inner margin, also more spine-like, about .1 mm. in length and rather upstanding, forming an angle of about sixty degrees, or more. First tarsal segment with about nine hairs on apical ventral half of segment.

Abdomen.—Cornicles about .286 mm. across. Harpagons black, united for almost all of their length.

Oviparous female.

Length varying from 2.71-2.84 mm. Color as in apterous viviparous female. Entire body free from all traces of pulverulence. Length of

antennal segments as follows: III .43-.46 mm., IV .185-.228 mm., V .21-.24 mm., VI .11-.14 + .057 mm. Secondary sensoria distributed as follows: III with neither primary or secondary sensoria, IV as a rule with neither primary or secondary sensoria, but primary sensorium may be present. V with primary sensorium, as a rule without secondary sensoria, but one may be present. Rostrum as long as or longer than body. Thorax and abdomen.—Legs less yellow than in viviparous females, more like those of male. Hind tibiae varying from 1.73-1.93 mm. Hind tibiae most unusual, as a rule without sensoria rarely with one, never with more than three.

Allotype apterous male, taken Oct. 5, 1954 on *Picea engelmannii*, Glade Park, Colorado. Morphotype Oviparous female, taken Sept. 21, 1954 on *Picea engelmannii*, Glade Park, Colorado. Both types deposited in the collection of the United States National Museum.

This must be a rare species. I collected the original material in 1923, this is the second time I have taken it, after years of searching. No one that has seen living specimens of this species will ever take it for anything else. *Picea engelmannii* is fairly common on the Fruita Reserve and southward on the Pinon Mesa, south of Glade Park, Colorado. Strangely enough, I found it on only one limb of a tree, despite the fact that I looked for it on hundreds of trees. On this limb, which was about three feet from the ground, and about two inches in diameter, the specimens were very abundant throughout the season. The colony encrusted on the bark of the limb almost solidly for as long as I could reach. The males in nature greatly resemble immature females, and are therefore very difficult to differentiate from them. I solved this problem by taking large numbers of females, and sorting the males from them under a microscope, even then I took only four males, in three trips after them. The oviparous females were very abundant, and developed through a long period of time starting in mid-September.

Cinara pilicornis (Hartig)

Prof. Palmer has kindly sent me for study several metatype slides of *C. piceicola* (Cholodkovsky). The material sent by Cholodkovsky was apparently sent in alcohol, and was mounted by L. C. Bragg. It is as I had suspected similar to *C. pilicornis* (H). The drawing of the sixth antennal segment of the apterous viviparous female is not correct as to hairs, in "Aphids of the Rocky Mountain Region." Prof. Palmer has further indicated to me that this drawing was not made from metatype material, as indicated on page 39 of her book. Dr. Pašek of Czechoslovakia, whose work in this group gave great promise, died last summer. He considered a much different species from *pilicornis* as *piceicola*. I suspect that the *peceicola* of Pašek is new, it differs greatly from *pilicornis* (H) and I would not expect Cholodkovsky to confuse the two, even if the material was not mounted. For the time being, we on this side of the Iron Curtain have no way of knowing just what species Cholodkovsky had, nor can we find out if his type material exists. His original description is inadequate, and hardly sufficient to distinguish *piceicola* from *hyalinus* Koch = *pilicornis*. It should also be noted that Cholodkovsky distinguished *hyalinus* from *pinicola* Kaltenbach, both species of which are synonyms of *pilicornis*. It is however significant that

Cholodkovsky mentions the male of *piceicola* as apterous, the male of *pilicornis* is said to be alate. He also mentions the fact that the sexual forms appear at the end of June or early July, but these continue to be found till mid-September, when the sexuals of *pilicornis* appear. As has been indicated elsewhere *C. fornacula* Hottes is a closely allied form.

Cinara obscura Bradley.

Cinara enigma H&K New Synonymy.

Dr. Bradley did not describe the sixth antennal segment of *C. obscura*, which is the most distinctive feature of this species, the unguis being very short and thick. His figure of this segment is not correct, the unguis being shown too long and slender. Since calling this to the attention of Dr. Bradley, he has provided me with a drawing which leaves no doubt that *enigma* is a synonym of *obscura* which has priority by a few months.



PROCEEDINGS
OF THE
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A NEW POCKET GOPHER FROM SOUTH-CENTRAL
UTAH

BY STEPHEN D. DURRANT

Durrant (Mammals of Utah, Taxonomy and Distribution, Univ. Kansas Publs. Mus. Nat. Hist., 1952) referred pocket gophers from extreme south-central Utah to *Thomomys bottae absonus*. At that time, he had but five specimens from that area of the state. Intensive collecting of mammals has been carried out during the past two summers, and specimens of *Thomomys bottae* were obtained from Garfield County, Utah, from a locality from which no specimens have been taken previously. Critical study indicates that these pocket gophers from Garfield County, Utah, belong to an heretofore unnamed kind.

The writer is indebted to Doctor John Aldrich, and Miss Viola S. Schantz, U. S. Fish and Wildlife Service, U. S. National Museum, Washington, D. C., for the loan of comparative materials. Capitalized color terms are after Ridgway (Color Standards and Color Nomenclature, Washington, 1912).

This research was carried out in part under a grant from the National Science Foundation.

Thomomys bottae powelli new subspecies

Type.—Adult female, skin and skull, number 7955, Museum of Zoology, University of Utah, Hall Ranch, Salt Gulch, 8 miles west of Boulder, 6,000 feet, Garfield County, Utah, collected by Stephen D. Durrant, August 7, 1951, original number 2578.

Range.—Known only from the type locality and immediate environs.

Diagnosis.—Size large (see measurements). *Color*: Upper parts and sides uniformly clear Cinnamon-Buff; top of nose with admixture of dark brown hairs; postauricular spots small and dark brown, underparts Pinkish Buff; chin, throat, perineal region, front feet, hind feet and distal ends of forearms and shanks, white. *Skull*: Large, robust; zygomatic arches heavy and widely spreading; widest posteriorly; nasals wide posteriorly, truncate and relatively short as compared with basilar length; extension of premaxillae posterior to nasals long; interpterygoid fossa short and widely V-shaped; pterygoid hamulae robust; upper incisors long and wide.

Measurements.—The measurements of two adult male topotypes, numbers 8981 and 9718, and the average and extreme measurements of 4 adult female topotypes (including the type) are, respectively, as follows: Total length, 233, 247, 226 (232-222); length of tail, 70, 70,

(76-65); length of hind foot, 32, 35, 32 (33-31); length of ear, 6, 6, 5.25 (6-5); basilar length, 35.6, 38.2, 34.4 (34.8-34.0); length of nasals, 12.2, 14.1, 12.85 (13.0-12.7); zygomatic breadth, 24.5, 26.1, 23.85 (24.7-23.5); mastoid breadth, 20.4, 21.5, 20.2 (20.8-19.7); interorbital breadth, 6.7, 6.5, 6.7 (6.8-6.5); alveolar length of upper molariform teeth, 8.0, 8.1, 7.9 (8.1-7.5); extension of premaxillae posterior to nasals, 3.2, 3.3, 3.4 (4.0-3.0); length of rostrum, 16.1, 17.3, 16.1 (16.5-15.6); breadth of rostrum, 8.0, 8.8, 7.9 (8.2-7.7).

Comparisons.—Topotypes of *T. b. powelli* differ from topotypes and near topotypes of *T. b. absonus* as follows: *Color*: Lighter throughout. *Skull*: Interparietal smaller and more triangular in shape; nasals markedly wider posteriorly, and more expanded anteriorly; extension of premaxillae posterior to nasals greater; interpterygoid fossa shorter and more widely V-shaped; cavities at posterior end of palate shallower; pterygoid hamulae heavier; palate wider; upper incisors markedly longer and wider.

Compared with topotypes and near topotypes of *T. b. osgoodi*, topotypes of *T. b. powelli* differ in: *Size*: Larger in nearly all measurements. *Color*: Darker throughout. *Skull*: Interparietal smaller; nasals shorter and wider posteriorly; posterior ends of nasals truncate as opposed to V-shaped; extension of premaxillae posterior to nasals greater; nasals flatter and more expanded distally; interpterygoid fossa shorter and more sharply V-shaped; cavities at posterior end of palate shallower; upper incisors longer and wider.

Topotypes of *T. b. powelli* differ from those of *T. b. dissimilis* in larger size, lighter color, larger, more massive skull, wider posterior ends of nasals, greater extension of premaxillae posterior to nasals and longer and wider upper incisors.

Among named subspecies, topotypes of *T. b. powelli* resemble those of *T. b. planirostris* the closest, but differ from them as follows: *Color*: Lighter throughout. *Skull*: Rostrum narrower; frontal processes of premaxillae narrower; nasals shorter, and wider posteriorly; posterior ends of nasals square as opposed to V-shaped; interparietal smaller and triangular as opposed to subquadrangular; pterygoid hamulae broader; cavities at posterior ends of palate smaller and shallow as opposed to deep.

Compared with topotypes of *T. b. trumbullensis*, topotypes of *T. b. powelli* differ in: *Size*: Larger in nearly all measurements. *Color*: Markedly lighter throughout. *Skull*: Larger, rostrum narrower; posterior ends of nasals wider; maxillary tongues of approximately the same length, but narrower; pterygoid hamulae shorter; interpterygoid space more widely V-shaped; cavities at posterior end of palate markedly shallower; tympanic bullae larger.

Remarks.—The range of *T. b. powelli* is quite isolated from that of other subspecies of *T. bottae*. Animals of this particular subspecies appear to be intruders who have taken over a range along a stream in the southern flank of the Aquarius Plateau. This range is surrounded on three sides by pocket gophers belonging to another species, *Thomomys talpoides*.

Reference to the literature will inform the reader that in south-central and southwestern Utah, there are several subspecies of pocket

gophers of the species *Thomomys bottae*. South of the range of *T. b. powelli*, in Arizona, *T. b. absonus* occurs; to the southwest in Arizona, *T. b. trumbullensis* occurs; to the west in Utah, *T. b. planirostris* occurs; to the northeast in the Henry Mountains, *T. b. dissimilis* occurs; and to the north, in the drainage of the Dirty Devil River, *T. b. osgoodi* occurs. All of these subspecies form a complex and show considerable relationship. All of them have relatively small isolated or nearly isolated ranges. Unquestionably, there is some small exchange of genes between animals of these subspecies. Here, then, is demonstrated the amount of genetic fixation that has taken place in these small populations, under semi-isolation. Also, something of the tempo as well as the mode of fixation is indicated, because none of these heretofore mentioned subspecies are considered to be older than extremely late Pleistocene.

These small, microgeographic populations are referred to as subspecies because they are distinct from other populations, have attained a position of comparative genetic stability, and merit some meaningful method of distinction from the general pattern of variation of the species. Moreover, designating them as subspecies, is the more precise, scientific manner to document their degree of advance.

Specimens examined.—15, from the type locality.

Contribution from the Museum of Zoology, University of Utah, Salt Lake City, Utah.

PROCEEDINGS
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TWO NEW RICE RATS (GENUS *ORYZOMYS*) FROM
FLORIDA

BY W. J. HAMILTON, JR., *Cornell University*

Among a series of small mammals collected in Lee County, Florida during the late winter and early spring of 1954, 26 *Oryzomys* were taken on Pine and Sanibel Island. The specimens from both of these islands are markedly distinct, both in color, in size and skull characters, from *Oryzomys palustris natator* and *Oryzomys palustris coloratus* and may be considered subspecifically distinct.

Oryzomys palustris planirostris, new subspecies

Type.—Adult female, skin and skull, number 8090, Cornell University Mammal Collection, collected one mile west of third bridge that spans Matachla Pass, Pine Island, Lee County, Florida, by W. J. Hamilton, Jr., March 11, 1954; original number 4344. The type has the following measurements: Total length, 240; tail vertebrae, 122; hind foot, 32; weight 50.5 grams. Skull: condylobasal length, 30.0; zygomatic breadth, 15.5; cranial breadth, 13.7; nasals, 12.0; interorbital breadth, 5.8; anterior palatine foramen, 6.7; palatal bridge, 6.0; upper molar series, 4.7.

Range.—Known only from Pine Island and an area two miles north of Fort Myers, Florida.

Diagnosis.—Size small (Table 1). Winter pelage, upperparts brownish gray, top of head and mid-dorsum darker with slightly buffy suffusion on sides and flanks, the buff color scarcely marked in some individuals; underparts dull white; feet white, tail dark gray above, whitish below. Color similar to Georgia and Virginia specimens of *O. p. palustris*, but with a browner caste. Skull small and weak, the supraorbital and temporal ridges much less pronounced than in *natator* or *coloratus*; rostrum relatively short and broad; anterior dorsal profile of skull straight, the nasals and frontals aligned, contrasting to the convex profile of *natator* and *coloratus*.

Comparisons.—*Oryzomys palustris planirostris* most nearly approximates in color and size *Oryzomys p. palustris*. It differs from both *natator* and *coloratus* in smaller size, lack of tawny coloration and the smaller and weaker skull characters.

Remarks.—Twelve specimens were collected in a garbage dump and adjoining wet land (about five feet above tide level, at the type locality). In company with *Sigmodon hispidus insullicola*, these animals were utilizing the cover formed by tin cans, cardboard cartons and other detritus. Traps placed in well marked runways took both species, as did those set in dense stands of *Spartina patens* well removed from the



TABLE 1
Average and extreme measurements in millimeters of rice rats, *Oryzomys palustris*, from Florida

		Total length	Tail vertebrae	Hind foot	Condylobasal length	Zygomatic breadth	Cranial breadth	Nasals	Interorbital breadth	Anterior palatal foramen	Palatal bridge	Upper molar series
<i>O. p. planirostris</i> 14 skins and 12 skulls	Ave.	247.5	119.6	31.0	29.3	15.8	13.4	11.2	5.5	6.4	5.8	4.8
	Max.	266.0	128.0	33.0	30.8	16.5	14.4	12.0	5.9	7.0	6.0	4.9
	Min.	226.0	108.0	29.0	27.4	15.1	12.7	10.0	5.1	5.8	5.3	4.5
<i>O. p. sanibeli</i> 11 skins and skulls	Ave.	257.5	123.6	31.0	31.4	16.1	13.4	11.7	5.4	7.0	5.9	4.9
	Max.	274.0	138.0	33.0	32.5	17.4	13.8	13.0	5.8	7.4	6.3	5.0
	Min.	233.0	111.0	28.0	29.4	15.2	13.0	10.6	5.1	6.8	5.5	4.0
<i>O. p. natator</i> 10 skins and skulls	Ave.	281.2	140.6	33.1	32.9	17.2	13.6	12.8	5.8	7.2	6.1	5.1
	Max.	318.0	173.0	37.0	34.8	18.8	14.0	14.0	6.2	7.8	6.6	5.3
	Min.	246.0	122.0	28.0	30.0	16.0	13.2	11.3	5.0	6.6	5.5	5.0
<i>O. p. coloratus</i> 11 skins and skulls	Ave.	283.0	143.5	33.4	32.7	17.1	13.8	12.4	5.7	7.2	6.2	5.2
	Max.	326.0	171.0	38.0	34.8	19.0	14.5	14.0	6.3	8.0	7.0	7.0
	Min.	250.0	123.0	31.0	30.6	15.3	13.0	11.2	5.4	6.3	5.8	4.6

dump. The rice rats were feeding on the stems of *Spartina*, a dropseed grass, *Sporobolus virginicus* and the succulent stems of *Sesuvium portulacastrum*. This series was taken on March 2, 3 and 11, 1954. None of the females were gravid or nursing, although one individual had enlarged and turgid uterine horns. The males had enlarged and descended testes, these measuring 9×5 to 13×7 mm. respectively. All the Pine Island specimens were taken at the type locality. Trapping in the environs of Bokeelia and St. James City produced cotton rats but no rice rats. A large male taken on March 20, 1954, two miles north of Fort Myers in a drainage ditch does not differ from those collected on Pine Island.

Florida Specimens Examined.—*Oryzomys palustris planirostris*: Pine Island, 13; two miles north of Fort Myers, 1. *Oryzomys palustris natator*: Lake Harney, 5; Chassahowitska River, 1; Ocala National Forest, 1; Crescent Lake, 1; Geneva, 1; Lake Kissimmee, 1. *Oryzomys palustris coloratus*: Cape Sable (topotypes) 9; Eden, 1; 15 miles northwest of Miami, 1.

***Oryzomys palustris sanibeli*, new subspecies**

Type.—Adult male, skin and skull, number 8192, Cornell University Mammal Collection, collected in freshwater marsh, four miles west of lighthouse on Sanibel Island, Lee County, Florida, by W. J. Hamilton, Jr., April 1, 1954; original number 4446. The type has the following measurements: total length, 263; tail, 125; hind foot, 33; weight, 71 grams. Skull: condylobasal length, 31.9; zygomatic breadth, 16.7; cranial breadth, 13.8; nasals, 11.8; interorbital breadth, 5.4; anterior palatine foramen, 6.8; palatal bridge, 5.9; upper molar series, 4.9.

Range.—Known only from Sanibel Island.

Diagnosis.—Size small (Table 1). Winter pelage, upperparts between amber brown and argus brown of Ridgway, the brownish color most pronounced on mid-dorsum. Dorsum of summer pelage similar to *Oryzomys palustris planirostris*, but with less gray. Underparts similar to *planirostris*. Skull like *planirostris* but larger, the nasals relatively longer; palatal foramen borders longer and less flaring than in *planirostris*. This insular race differs from *planirostris* primarily in the bright brown winter pelage.

Comparisons.—The Sanibel Island specimens are similar in winter pelage to *Oryzomys palustris natator* and *Oryzomys palustris coloratus*, chief difference being in the brighter dorsal pelage and the markedly smaller size, both in body measurements and skull. From winter specimens of *planirostris*, *sanibeli* may be at once recognized by the brown pelage, which contrasts with the general gray tone of the former.

Remarks.—The rice rats on Sanibel Island appear to be concentrated in the fresh water swamps provided by artesian wells; single specimens were taken in a swale behind the only school house on the island and in a cattail stand adjoining the south beach road. In the swamp area where specimens were collected, the dominant vegetation consists of cattails. All specimens were trapped near the water's edge; on the drier ground the cotton rat, *Sigmodon hispidus insulicola* was abundant. In this area, the two animals do not appear to cross the local ranges of each other. A noticeable stickiness was noted on the plantar surface

of the hind foot in all *Oryzomys* collected on Sanibel Island, in contrast to fresh specimens I have handled elsewhere. Goldman (N. A. Fauna 43, 1918) states that the new coat of *Oryzomys* seems to replace the old almost imperceptibly, but that adults in apparently fresh and in obviously worn pelages may often be seen together. The rice rats from Sanibel are in several stages of molt, the line of demarcation and the pronounced color difference in winter and summer pelage being well marked. Molt commences on the head and proceeds caudad. This pelage change demonstrates the marked seasonal color variation and the lack of such in other races of *palustris* from southeastern United States.

A collection of 300 barn owl pellets from a former boat loading shed in Tarpon Bay, Sanibel Island, produced many *Sigmodon* skulls and bones, but not a single *Oryzomys*. This may indicate the restricted or spotty distribution of rice rats on Sanibel.

Specimens Examined.—Same as for *planirostris*.

For the loan of specimens, acknowledgment is made to Viola S. Schantz of the U. S. Fish and Wildlife Service. Paratypes of *planirostris* and *sanibeli* have been deposited in the U. S. National Museum.

PROCEEDINGS
OF THE
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NEW RECORDS AND DESCRIPTIONS OF
CALIFORNIAN DIPLOPODA

BY NELL B. CAUSEY, *Fayetteville, Arkansas*

I am indebted to Mr. Joe E. Gorman for most of the millipeds reported on in this paper. With but two exceptions, which are indicated, they were among the invertebrate associates that he collected during his study of the ecology of the salamander genus *Hydromantes*. Most are from the Sierra Nevada Mountains of California. Holotypes will be deposited in the permanent collection of the American Museum of Natural History. The remaining specimens are in the collection of the author.

Superorder Colobognatha

Order Polyzoniida

Family Polyzoniidae

Bdellozonium sequoium Chamberlin

Bdellozonium sequoium Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no. 3, p. 5 (female, Hammond, Tulare Co., Calif.).

Records: *Mariposa Co.*: Yosemite National Park, Vernal Falls, May 30, 1953, one female, 48 segments. Hidden Meadow, April 17, 1954, several specimens, the largest a male of 52 segments, width 3.3 mm.

Order Platydesmida

Family Andrognathidae

Brachycybe producta Loomis

Brachycybe producta Loomis, 1936, Proc. U. S. Natl. Mus., vol. 83, no. 2989, pp. 367-368, fig. 32, h, i (male, ? central mountainous portion of lower California).

Record: *Mariposa Co.*: Yosemite National Park, Vernal Falls, May 30, 1953, one female, 76 segments.

Eucybe clarus Chamberlin

Eucybe clarus Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no. 4, p. 3 (female, Hastings Reservation, Monterey Co., California).

Record: *Tulare Co.*: Silliman Gap Trail, Redwood Canyon, Sequoia National Park, May 16, 1953, fragment of one male.

Superorder Eugnatha

Order Spirobolida

Family Spirobolidae

Californibolus uncigerus (Wood)

Spirobolus uncigerus Wood, 1864, Proc. Acad. Nat. Sci. Philadelphia,

vol. 15, p. 15 (male, California); 1865, Trans. Amer. Philos. Soc., vol. 13, p. 209, fig. 36.

Tylobolus uncigerus, Cook, 1904, Harriman Alaska Exped., vol. 8, no. 1, p. 67.

Californibolus uncigerus, Chamberlin, 1949, Jour. Washington Acad. Sci., vol. 39, no. 5, p. 166.

Records: *Shasta Co.*: Low Pass Creek, April 1, 1953, two males; March 25, 1951, one female, width 8.7 mm., 49 segments. Round Mountain, April 1, 1953, one male, width 7 mm., 52 segments.

The color is variable. Usually the midbelts are bright red-brown, but they may be gray; the hindbelts vary from bright brown to very dark brown. The distribution of prickles on the cephalic surface of the last article of the posterior gonopods is as in *C. rectus* Chamberlin, 1949. Other details of the gonopods correspond to Wood's figure.

Californibolus pontis Chamberlin

Californibolus pontis Chamberlin, 1949, *ibid.*, vol. 39, no. 5, p. 166, figs. 18, 19 (male, Bridgeville, Humbolt Co., California).

Record: *Shasta Co.*: Low Pass Creek, April 14, 1952, one male, width 4.7 mm., 52 segments.

Auxobolus ergus Chamberlin

Auxobolus ergus Chamberlin, 1949, *ibid.*, vol. 39, no. 5, p. 163, figs. 5-7 (male, Tollhouse, Fresno Co., California).

Record: *Mariposa Co.*: Trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one male, width 7 mm., 56 segments.

Several females and larvae collected at Briceburg, Mariposa Co., November 13, 1952, January 3, 1953, and February 26, 1954, have been tentatively assigned to this species.

Order Julida

Family Paraiulidae

Spathiulus elegantulus Causey

Spathiulus elegantulus Causey, 1950, Proc. Ark. Acad. Sci., vol. 3, pp. 47-48, figs. 18-21 (male, Happy Isles, Yosemite National Park, California).

Record: *Mariposa Co.*: Trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one male, 53 segments, 3 legless, light brown.

? *Bollmaniulus*

Records: *Mariposa Co.*: Trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one larva. *Shasta Co.*: Madison Creek, Sept. 2, 1951, one female, width 4.3 mm., several larvae.

Family Paeromopidae

Paeromopus cavicolens Chamberlin

Figure 1

Paeromopus cavicolens Chamberlin, 1953, Proc. Biol. Soc. Washington, vol. 66, pp. 68-69, figs. 3, 4 (male, Windeler Cavern, Tuolumne Co., California).

Records: *Mariposa Co.*: Vernal Falls, Yosemite National Park, May 30, 1953, one female, width 5.8 mm., 71 segments. Breeceburg, Feb. 26, 1954, one female, width 5.8 mm.; several larvae. *Shasta Co.*: Low Pass Creek, Jan. 29, 1953, one female, width 6.4 mm.; March 25, 1952, one female, width 7.4 mm., 72 segments; April 1953, one female, width 7.4 mm., 73 segments. Bass Creek, April 1953, one female, width 7.6 mm., 69 segments.

The details of the anterior gonopods of this species are shown in figure 1. The apex of the posterior gonopods is expanded into a small, thin-walled corolla. In specimens from Shasta County there is an orange band on the metazonites that extends as far ventrad as the pores, but in specimens from Mariposa County the dorsal orange bands are almost or completely replaced by the general body color. No significant differences between the gonopods of the specimens from these two counties were observed.

Atopolus chamberlini (Brölemann)

Figure 2

Paeromopus chamberlini Brölemann, 1922, Ann. Ent. Soc. Amer., vol. 15, no. 4, pp. 289, 298-299, figs. 6-9, 53-57 (male, Mt. Shasta, Siskiyou Co., California).

Atopolus chamberlini, Chamberlin, 1949, Nat. Hist. Misc., no. 52, p. 4.

Records: *Shasta Co.*: Low Pass Creek, Jan. 24, 1953, one male, width 4.7 mm.; one female, width 5 mm. Round Mt., April 1953, several larvae.

Mr. Gorman described this species in his field notes as "brown, with a broad, cream, dorsal, longitudinal band." The female has the band the entire length of the body, but in the male it extends only half the length of the body. The minute details of the gonopods differ a little from Brölemann's figures, possibly because he was more interested in the fundamental relationships of this species than in its specific characters. The right anterior gonopod is shown in figure 2.

Klansolus vicinus (Chamberlin)

Californiulus vicinus Chamberlin, 1943, Bull. Univ. Utah, biol. ser., vol. 8, no. 2, pp. 12-13, figs. 40-42 (male, Dickson Flats, Shasta Co., California).

Klansolus vicinus Chamberlin, 1949, Nat. Hist. Misc., no. 52, p. 5.

Record: *Shasta Co.*: Lassen Volcanic National Park, Summit Lake, June 26, 1951, one male, 73 segments, width 4.4 mm. (L. R. and H. W. Levi).

Klansolus yosemitensis (Chamberlin)

Californiulus yosemitensis Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no. 4, p. 17, pl. 3, figs. 24-26 (male, Aspen Valley, Yosemite National Park, California).

Klansolus yosemitensis Chamberlin, 1949, Nat. Hist. Misc., no. 52, p. 5.

Records: *Mariposa Co.*: Yosemite National Park, Vernal Falls, May 30, 1953, two males, one female; Mariposa Grove, May 14, 1879, one female, 70 segments, 6 mm. (Illinois Natural History Survey). *Tulare Co.*: Sequoia National Park, Redwood Canyon, Silliman Gap Trail, May 16, 1953, one female, 68 segments, width 5 mm.

Order Chordeumida

Family Caseyidae

Caseya sequoia Chamberlin

Caseya sequoia Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no. 5, p. 10, pl. 2, figs. 17-18 (female, Sequoia National Park, Tulare Co., California).

Records: *Mariposa Co.*: Briceburg, February 26, 1954, one female.
Tuolumne Co.: Sonora Pass, November 15, 1952, one immature male.

Family Conotylidae

? *Conotyla*

Record: *Mariposa Co.*: Trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one female, length 11 mm.

Order Polydesmida

Family Xystodesmidae

All of the xystodesmids in this collection have the second article of the legs spined and the first article and the adjacent sternum unspined. The following key is based on somatic characters, mostly generic, of specimens of either sex, and it must be supplemented with figures of the male gonopods:

- 1(2). Anterior margin of collum elevated near each antenna. Keels of second segment extend farther laterad and ventrad than do those of either the collum or the third segment.....*Amplocheir reducta*
- 2(1). Anterior margin of collum not elevated at any point. Keels of second segment not conspicuously wider or lower than those of the collum or of the third segment..... 3
- 3(8). Keels of second, third, and sometimes the fourth, segments directed slightly cephalad; anterior angle of these keels square and often bearing a single small tooth 4
- 4(5). Keels of middle body segments quadrangular.....*Harpaphe pottera*
- 5(4). Keels of middle body segments triangular 6
- 6(7). Anterior margin of collum forms an uninterrupted convex curve*Hybaphe tersa*
- 7(6). Anterior margin of collum convexly curved, but interrupted near each antenna by a very shallow depression.....? *Paimokia*
- 8(3). Keels of second, third, and fourth segments directed laterad; anterior angles of these keels rounded, never bearing an obscure tooth 9
- 9(10). Metazonites of last few segments with several irregular rows of tubercles*Xystocheir cooki*
- 10(9). Metazonites of last few segments with faint traces of a single row of tubercles on the margin.....*Delocheir conservata*

Harpaphe pottera Chamberlin

Harpaphe pottera Chamberlin, 1949, Proc. Biol. Soc. Washington, vol. 63, p. 129, fig. 10 (male, Potter Creek, Mendocino Co., California).

Records: *Shasta Co.*: Brock Mt., April 16, 1952, one male, one female.
Low Pass Creek, March 25, 1951, one female; January 21, 1952, one male.
Madison Creek, September 2, 1951, two males, widths 6.6 and 6 mm.

Hybaphe tersa Cook

Hybaphe tersa Cook, 1904, Harriman Alaska Exped., vol. 8, no. 1, p. 58 (male, Almata, Whitman Co., Washington).

Records: *Shasta Co.*: Low Pass Creek, January 29, 1953, one male, one female; April 1953, one male. Madison Creek, Sept. 2, 1953, two males.

In the only specimens in which the color appears to be fully developed, the metazonites are red-orange and the prozonites are green to brown. The shape of the prefemoral branch of the gonopods is somewhat variable as to width and the apex is either acute or rounded.

Xystocheir cooki, new species

Figure 3

Diagnosis: All four prongs of the male gonopod are attenuated as in *Xystocheir tularca* Chamberlin 1949, but they are relatively wider and shorter than described for that species.

Type locality: Tulare Co., Sequoia National Park, Redwood Canyon, Silliman Gap Trail, May 16, 1953, two males, one female.

Male holotype: Width 5.5 mm. Color faded in preservative. Dorsum shining. Beginning sparsely on the second segment and becoming very numerous proceeding caudad, there are small but well defined tubercles on the metazonites, but not on the keels. On segment 16 there are four or five very indefinite rows, with about 20 in each row, while on segments 18 and 19 they are more numerous, but not contiguous. Keels of segments two through four directed laterad; their anterior angle is rounded and the posterior angle is right to a little obtuse. Beginning with the keels of the fifth segment and increasing toward the hind end of the body, the anterior angle is broadly rounded, the posterior angle is produced a little caudad, and the posterior margin is minutely dentate; the lateral margin is either straight or slightly convex. Keels of segment 19 less than half the length and width of keels of segment 18. Dorsum arched. Pores on margin of keels, opening above, and marked by no conspicuous swelling. Anal tergite narrowly produced, the apex truncate. Coxa of the third legs with a sparsely setose, anteriorly directed, finger-like lobe arising from the medial surface; these lobes are about the same thickness and twice the length of the seminal lobes of the second legs. Last two articles and ventral surface of coxae of all legs densely setose; other surfaces of legs sparsely setose. Second article of all legs behind the gonopods spined, the spines long, sharp, and curved on the posterior legs. Coxae and sternum unspined.

Telopodite of gonopods subparallel, not contiguous, all four prongs attenuated, but only the prong carrying the seminal canal is twisted (fig. 3). Shaft of telopodite thickly setose on the dorsal surface; the end of some of the setae reach as high as the base of the lowest prong.

Female paratype: Width 6 mm., length 31 mm. Dorsum a little higher and keels a little narrower than in the male, but the shape of the keels and the distribution of tubercles are as in the male. Coxa of second legs with a stiff, finger-like, ventrally directed process arising from the medio-distal margin. Second article of legs behind the tenth spined as in the male. Below the spine the legs are glabrous; beyond the spine they are sparsely setose, except the tarsus, which is thickly setose.

It is a pleasure to name this species for the late Dr. O. F. Cook.

? *Paimokia*

Record: *Mariposa Co.*: Briceburg, 0.6 to 0.7 mile northeast, Nov. 15, 1952, one male of 19 segments.

***Amplocheir reducta*, new species**

Figure 4

Diagnosis: Distinguished from *Amplocheir sequoia* (Chamberlin, 1941) by the proximal joint of the male gonopod, which bears, instead of three slender spines, one blunt setose process and a longer, flattened, acute process.

Type locality: *Mariposa Co.*, Briceburg, 0.6 to 0.7 mile northeast, Nov. 15, 1952, one male; Feb. 26, 1954, one female.

Male holotype: Width 4.2 mm., length about 24 mm. Color faded in preservative. Exoskeleton thin. Dorsum weakly arched, most of the keels horizontal. Beginning sparsely on the third segment and becoming more numerous on the metazonites of the posterior segments, there are low tubercles, each with a punctum on its apex. The tubercles are obsolete and scattered on the anterior half of the body, but on the posterior half they are arranged in three rows; the anterior row is scattered, but the second and third are even and distinct. There are seldom more than 20 tubercles in a row, and they never extend out on the keels. Coxa of third legs with a setose, anteriorly directed process about the length and thickness of the seminal lobe of the second legs. A pair of low mounds on the sternum between the fifth legs. All coxae very setose ventrad; other articles of the legs sparsely setose, except the tarsal, which is thickly setose. Sternum glabrous. Coxae and sternum unspined. Second article of all legs behind the gonopods spined.

Anterior margin of collum elevated noticeably near each antenna. Keels of collum widely rounded, for the family. Keels of segments two through four directed laterad; their anterior angle is rounded and the posterior angle is rounded-obtuse. Keels of second segment extend farther laterad and ventrad than the keels of either the collum or of the third segment, thus resembling the *Strongylosomidae*. On segments five through 15 the keels are acute and slightly hooked; behind 15 the caudal angle becomes increasingly less acute. Cephalic and lateral margins of keels form a wide, even curve; caudal margins very finely granulated. Keels of segment 19 about two-thirds as wide and long as those of segment 18. Anal tergite narrowly produced, the apex truncate; apical half depressed. Pores on margin of keels, opening above in a slight swelling.

Telopodites of gonopods subparallel *in situ*, with the mesial processes of the proximal segment crossing. The telopodite ends in two long, curved, aciculiform processes; the proximal segment bears only one process (fig. 4), thus differing from the generotype, *A. sequoia*, where there are three.

Female topotype: Width 5.4 mm. Color incompletely developed, but there are traces of orange on the lateral margin of the keels and of brown on the metazonites. Collum, keels, tuberculation of metazonites, anal tergite, and spination of legs as described for the male. Coxae of second legs with a stiff, finger-like, ventrally directed process arising from the disto-medial margin.

Delocheir conservata Chamberlin

Delocheir conservata Chamberlin, 1949, Jour. Washington Acad. Sci., vol. 39, no. 3, p. 99, fig. 18 (male, Hastings Reservation, Monterey Co., California).

Record: *Mariposa Co.*: Briceburg, Feb. 24, 1952, one male, width 5.6 mm.

Family **Sigmocheiridae**, new family

The family Sigmocheiridae is proposed for the genera *Sigmocheir* Chamberlin, 1951, and *Orophe* Chamberlin, 1951, which formerly were included in the family Eurydesmidae. Unexpected and previously unpublished characters in these genera are the rigid fusion of the coxae of the gonopods and the concave anterior margin of the wide collum (fig. 5).

Type genus: *Sigmocheir* Chamberlin, 1951.

The following characters apply to a male of the type genus: exoskeleton smooth and heavy, body moniliform; keels high and wide, most of them horizontal, their corners rounded, produced caudad only on the last two or three segments; middle of metazonites slightly higher than keels; apex of anal tergite narrow, conical; pore formula 5, 7, 9, 10, 12, 13, 15-19; pores open laterad from a longitudinal welt; margins of anal valves compressed, elevated; anal sternum triangular; legs without any special enlargements or spines; legs and antennae relatively longer than in the Xystodesmidae; sterna of last four or five diplosomites with a small spine adjacent to each coxa; gonopodal opening transversely oval. Coxae of gonopods rigidly fused along a short medial suture; coxae also connected by a thick, transverse muscle dorsal to the suture; coxal horns present on the mesial distal surface of the coxae, just beyond the suture; telopodites simple, directed cephalad, the tibio-tarsal region set off by a suture.

The Sigmocheiridae resemble the Mexican and Central American family Rhachodesmidae, and if the gonopods did not lack a coxal horn in that family the two groups might be put together. Somatically the Sigmocheiridae are very unlike any of the several other families in which the gonopods are coalesced; they undoubtedly represent an independent and rather recent development of that character. The range, Montana and California, overlaps that of the family Xystodesmidae, from which they are easily distinguished by the moniliform appearance, the high keels, the absence of spines on the second article of the legs, and the medial fusion of the gonopodal coxae.

Sigmocheir calaveras, Chamberlin

Figure 5

Sigmocheir calaveras Chamberlin, 1951, Nat. Hist. Misc., no. 87, pp. 5-6, figs. 10, 11.

Records: *Calaveras Co.*: Wool Hollow, April 10, 1952, one male, width 7 mm. *Mariposa Co.*: Briceburg, Feb. 24, 1952, one male, width 7.4 mm.; trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one female of 19 segments, width 5.5 mm.

When the color is fully developed the keels are bright yellow, remainder of dorsum except for large, medial, ovoid, yellow areas on the metazonites are yellow; legs lighter yellow.

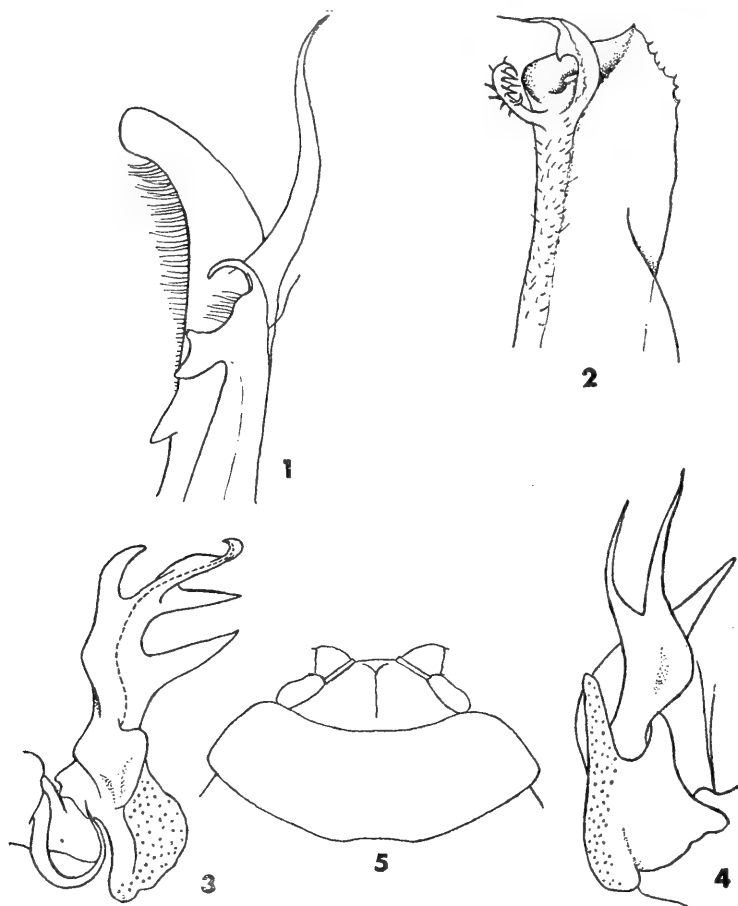


Fig. 1. *Paeromopus cavicolens*. Left anterior gonopod, cephalic surface.

Fig. 2. *Atopoulus chamberlini*. Right posterior gonopod, cephalic surface.

Fig. 3. *Xystocheir cooki*, new species. Left gonopod, subdorsal view, male paratype.

Fig. 4. *Amplocheir reducta*, new species. Left gonopod, subventral view, male holotype.

Fig. 5. *Sigmocheir calaveras*. Head and collum, dorsal surface.

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A NEW CRAYFISH OF THE GENUS *CAMBARUS*
FROM MISSISSIPPI

BY HORTON H. HOBBS, JR.

Samuel Miller Biological Laboratories, University of Virginia

The new species described below was collected from four localities in eastern Mississippi in the Pascagoula and Tombigbee drainage systems. In its habits it resembles *Cambarus fodiens* (Cottle, 1863: 217) and *Cambarus uhleri* Faxon (1884: 116), and probably is a secondary burrower (Hobbs, 1942: 20). Most of the specimens were taken in shallow water from among grasses and debris in roadside ditches; however, others were found in sluggish portions of streams and a few were dug from simple burrows less than two feet in depth.

Because of the unusual combination of certain characteristics and the unique chela and first pleopod of the male a new Section of the genus is proposed below to receive this crayfish. (see *Relationships*).

Genus *Cambarus* Erichson, 1846

Cambarus cristatus,¹ sp. nov.

Diagnosis.—Rostrum subplane or slightly excavate, ovate, and without lateral spines at base of acumen. Areola 4-7.5 times longer than broad and comprising 31-32 percent of entire length of carapace. Lateral surfaces of carapace devoid of spines or prominent tubercles. Suborbital angle obsolete. Postorbital ridges without spines or tubercles on cephalic extremity. Antennal scale almost one-half as broad as long. Chela with a cristiform row of tubercles on inner margin of broad palm, the upper surface of the latter covered with small ciliated squamous tubercles. First pleopod of first form male with central projection directed at approximately a 65 degree angle to the main shaft of the appendage and the relatively slender mesial process at a 90 degree angle. Annulus ventralis of female movable; see figure 7.

Holotypic Males, Form I.—Body subcylindrical. Abdomen narrower than thorax (6.2-7.8 mm. in widest parts respectively). Width of carapace less than depth in region of caudodorsal margin of cervical groove (7.8-8.0 mm.). Areola relatively broad (4.7 times longer than wide), with moderately deep punctations, three across narrowest portion. Cephalic section of carapace 2.1 times as long as areola (length of

¹L. *crista*—crest. So named because of the cristiform row of tubercles along the inner margin of the palm of the chela.



areola 32.1 percent of entire length of carapace). Rostrum subspatulate in outline with a small up-turned acumen; margins, not swollen and only slightly elevated, diverge for a short distance from base before gently converging toward apex; no lateral spines present. Upper surface subplane, a slight submedian depression in basal half and with minute setiferous punctations. Subrostral ridges poorly developed and visible in dorsal aspect for a short distance at base.

Postorbital ridges, long, well-defined and with dorsolateral longitudinal grooves; cephalic extremities without tubercles or spines. Suborbital angle obsolete. Branchiostegal spine acute and well-defined. No spines or tubercles on side of carapace immediately caudad of cervical groove. Carapace punctate dorsad and weakly granulate laterad. Abdomen longer than carapace (18.1-16.2 mm.). Cephalic section of telson with four spines in the right and three in the left caudolateral corners.

Epistome (fig. 8) broadly triangular with a subplane surface and a small cephalomedian projection. Antennules of the usual form with a prominent spine on the lower surface of basal segment. Antennae extend caudad to fourth abdominal segment. Antennal scale (fig. 3) broader in distal than in proximal half, almost one-half as long as broad; outer thickened portion not so wide as lamellar area and terminating distally in an acute spine.

Chela with broad palm only slightly inflated: upper surface of palmar area with ciliated squamous tubercles and lower with setiferous punctations. Inner margin of palm with a cristiform row of 17 tubercles. All other tubercles on palm distinctly smaller. Fingers not gaping. Upper and lower surfaces of both fingers with a submedian longitudinal ridge flanked by setiferous punctations; ridges on upper surfaces more prominent. Opposable margin of dactyl with a row of three corneous-tipped tubercles along basal half, between and distad of which is a sublinear arrangement of minute denticles; mesial margin with setiferous punctations, the more distal ones of which lie in a longitudinal groove. Opposable margin of immovable finger with three tubercles along proximal half; the distal one lies in a lower plane of the finger than that of the two proximal ones; distad and between these tubercles are minute denticles corresponding in position to those on the dactyl; lateral margin of finger with a row of setiferous punctations.

Carpus of cheliped a little longer than broad, and with a distinct longitudinal furrow above; mesial half of podomere with conspicuous tubercles and lateral half with setiferous punctations. Only two tubercles on podomere conspicuously larger than others—one on mesial surface distad of midlength, and the other at lower, outer distal margin.

Merus of cheliped with upper, mesial, and lower surfaces tuberculate and lateral surface punctate. Although tubercles on lower surface are scattered, an inner row of 17 tubercles and an outer one of nine are moderately well-defined.

Hooks on ischiopodites of third pereopods only; hooks strong and simple. Coxa of fourth pereopod without a conspicuous prominence; a small ventrally projecting triangular one present on fifth.

Sternum at base of coxopodite of third and fourth pereopod with prominent setiferous lobes—more conspicuous than those of most crayfishes.

First pleopod (figs. 1, 5) reaching coxopodite of third pereopod when abdomen is flexed; distal portion terminating in two distinct parts. Central projection corneous, with an acute tip, and bent at an angle of about 65 degrees. Mesial process non-corneous, with distal portion slender and directed at a 90 degree angle to the main shaft of the appendage. Both terminal elements directed caudad.

Morphotypic Male, Form II.—Differs from the holotype in the following respects: Upper surface of rostrum more hirsute; punctations in areola not so conspicuous or so abundant; cephalic section of telson with four spines in each caudolateral corner; row of tubercles along inner margin of palm much reduced and scarcely visible; opposable margins of fingers of chelae with very weak tubercles and a single row of minute denticles. Groups of tubercles on proximal podomeres of chelipeds occur in smaller numbers and are reduced in size. The usual differences occur in the secondary sexual characteristics—i.e., hooks on ischiopodites of third pereopods much reduced; central projection of first pleopod noncorneous and blunt, and mesial process subtriangular (figs. 2 and 4); also sternal prominences at bases of third and fourth pereopods less conspicuous. (See measurements.)

Allotypic Femlae.—Differs from the holotype in the following respects: Upper surface of rostrum hirsute; cephalic section of telson with three spines in each caudolateral corner; inner margin of palm of chela with a cristiform row of 14 tubercles. Annulus ventralis subovate with the greatest length in the transverse axis. The broadly S-shaped sinus originates near the midcephalic margin of the annulus and passes caudad to its midcaudal margin; surface features are illustrated in figure 7. Sternal plate immediately caudad of annulus ventralis subrectangular in outline.

Measurements.—As follows (in mm.):

	Holotype	Morphotype	Allotype
Carapace—			
Height	8.0	6.3	7.4
Width	7.8	6.5	8.1
Length	16.2	14.2	16.8
Areola—			
Width	1.1	0.9	1.1
Length	5.2	4.7	5.5
Rostrum—			
Width	3.0	2.6	3.2
Length	3.5	3.4	3.8
Chela—			
Length of inner margin of palm	4.5	2.5	3.4
Width of palm	4.7	2.5	4.2
Length of outer margin of hand	10.3	6.7	8.7
Length of dactyl	5.5	4.2	5.0

Type Locality.—Roadside ditch, 11.3 miles south of Macon on Route 45, Noxubee County, Mississippi. Here the animals were collected with a seine pulled through the grass and litter on the clay bottom. In no place was the turbid water more than a foot deep. One or two specimens were dug from simple burrows about one and one-half feet deep. Other

crayfishes taken at the same time were *Procambarus acutissimus* (Girard, 1852:91) and an undescribed species of the latter genus.

Disposition of Types.—The holotypic male, form I, allotypic female, and morphotypic male, form II are deposited in the United States National Museum (nos. 96985, 96986, and 96987, respectively). Of the 51 paratypes, one male, form I, one male, form II, and one female are deposited in the Museum of Comparative Zoology and a similar series in the collection of Dr. G. H. Penn. Three males, form I, eight males, form II, 25 females, four juvenile males and five juvenile females are retained in my personal collection at the University of Virginia.

Variations.—The areola varies in width from 4-7.5 times longer than broad, with from two to four punctations in narrowest part. In some specimens the punctations are scattered and relatively inconspicuous while in others they are more abundant and prominent. The row of tubercles on the palm of the chela varies from 14 to 18, the males usually having a larger number than the females. Among the minor variations in numbers of spines or tubercles is a range of two to five spines in the posterolateral corners of the cephalic section of the telson. The only suggestion of distinct local variations is seen in the annulus ventralis of the two females from Lauderdale County. In these specimens the sinus, which is not well-defined, is not so sinuous and lies in a longitudinal depression which is more conspicuous than that seen in females from the type locality.

Relationships.—*Cambarus cristatus* is not closely related to any described species of the genus. The first pleopod more nearly resembles that of certain members of the Diogenes Section, while the short, broad areola is similar to that of certain members of the Bartonii Section. In its habits, as stated above, it is similar to *Cambarus fodiens* and *C. uhleri*. The shape of the chela and the broad antennal scale are unique, not found in any other members of the genus *Cambarus*. For the reasons stated it seems best to assign *cristatus* to a separate section of the genus, the *Cristatus* Section.

Specimens Examined.—A total of 54 specimens have been examined from the following four localities in Mississippi. *Kemper County*: 4-1954-12c, Backwaters of Scooba Creek, 21.1 miles south of Scooba on U. S. Highway 45, 1 juv. ♂, W. R. West and Hobbs, coll. *Lauderdale County*: 4-1854-3b, Roadside ditch, 5 miles south of Meridian on U. S. Highway 11, 2 ♀♀, Jean E. Pugh, Sam R. Telford, and Hobbs, coll. *Lowndes County*: 4-1454-2c, Small stream, 0.5 miles north of the Noxubee County line on U. S. Highway 45, 1 ♀, 3 juv. ♂♂, 5 juv. ♀♀, J. E. P., S. R. T., and H. H. H. coll. *Noxubee County*: (Type locality) 4-1454-4a, roadside ditch, 11.3 miles south of Macon on U. S. Highway 45, 6 ♂♂ I, 11 ♂♂ II, 25 ♀♀, J. E. P., S. R. T., and H. H. H. coll. All of the specimens were collected from roadside ditches or from sluggish areas of streams. In both situations they were found among grass or in the detritus collected on the bottom, and a few specimens were dug from simple burrows.

Literature Cited

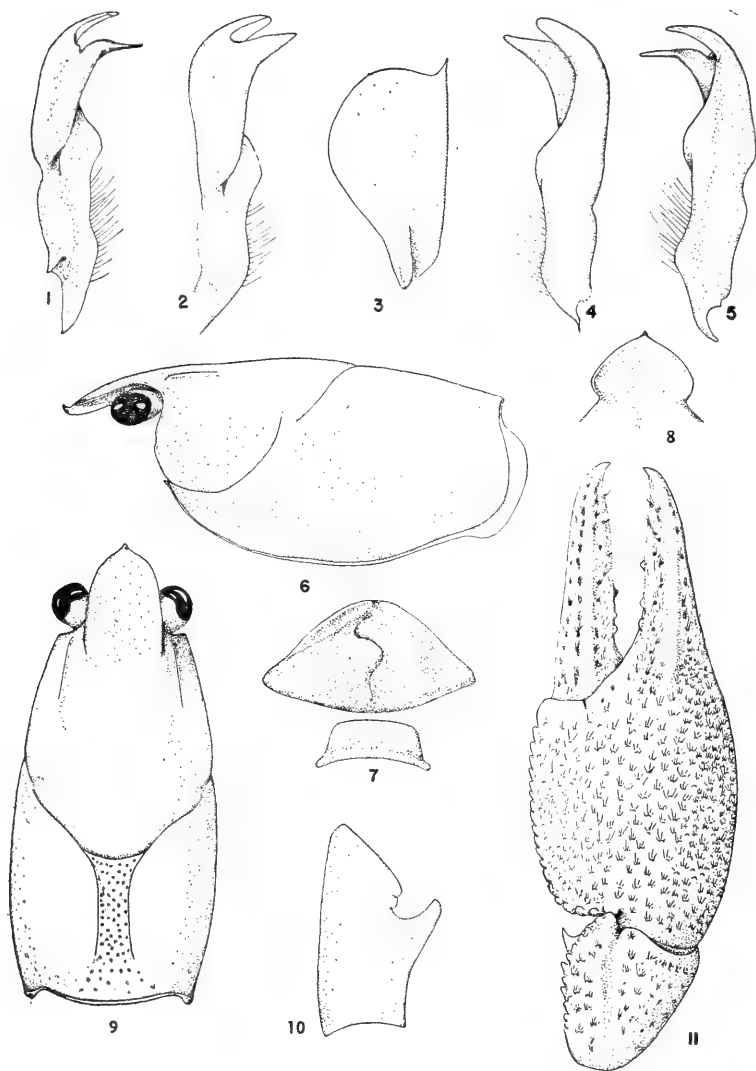
- Cottle, T. J. 1863. On the two species of *Astacus* found in upper Canada. *Can. Jour. Industry, Sci., and Arts*, 45: 216-219.

- Erichson, W. F. 1846. Übersicht der Arten der Gattung *Astacus*. *Arch. für Naturgeschichte*. Jahrg. 12, (part 1): 86-103.
- Faxon, Walter. 1884. Descriptions of new species of *Cambarus*; to which is added a synonymical list of the known species of *Cambarus* and *Astacus*. *Proc. Amer. Acad. Arts and Sci.*, 20: 107-158.
- Girard, Charles. 1852. A revision of the North American Astaci, with observations on their habits and geographical distribution. *Proc. Acad. Nat. Sci., Phila.*, 6: 87-91.
- Hobbs, Horton H., Jr. 1942. The crayfishes of Florida. *Univ. of Florida Pub., Biol. Sci. Series*. 3(2): 1-179, 3 test figs., 11 maps, 24 pls.

Explanation of Figures

Cambarus cristatus, sp. nov.

- Fig. 1—Mesial view of first pleopod of male, form I.
- Fig. 2—Mesial view of first pleopod of male, form II.
- Fig. 3—Antennal scale.
- Fig. 4—Lateral view of first pleopod of male, form II.
- Fig. 5—Lateral view of first pleopod of male, form I.
- Fig. 6—Lateral view of carapace of male, form I.
- Fig. 7—Annulus ventralis of female.
- Fig. 8—Epistome.
- Fig. 9—Dorsal view of carapace of male, form I.
- Fig. 10—Ischiopodite of third pereopod of male, form I.
- Fig. 11—Distal podomeres of cheliped of male, form I.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THREE NEW SUBSPECIES AND FIGURES OF FIVE
PREVIOUSLY UNFIGURED SPECIES OF *CINARA*
(APHIDAE)

By F. C. HOTTES

Sooner or later every taxonomist comes across specimens which present some variation from the typical forms of described species. Such is the case of the three forms described herewith. Had these forms been observed critically enough when alive, had more material been collected, or had an opportunity to follow the life cycle been afforded, they might have been described as species. For the present it may suffice to describe them briefly as subspecies and call attention to their variations.

Cinara villosa (G&P) subspecies *parvavillosa* n. subspecies.

This form which is described as a new subspecies of *C. villosa* differs from typical specimens of that species, in the vastly fewer number of hairs on the abdomen of both the alate and apterous viviparous females, the hairs are not only fewer in number, but are finer and somewhat shorter, than those of the typical form. There are also fewer hairs on the antennae, and the fourth segment of the rostrum is slightly shorter.

Holotype apterous viviparous female, taken on *Pinus flexilis* var *reflexa* June 13, 1954, Summerhaven, Arizona. Morphotype alate viviparous female, George D. Butler, Jr., Summerhaven, Arizona, May 31, 1954. Both types deposited in the United States National Museum.

What has been determined as the typical form of *C. villosa* has been taken in the same region on the same host. The host of *C. villosa* as known from Colorado is *Pinus flexilis*.

Cinara villosa (G&P) and *Cinara wahtolca* H. are allied species, in fact, *C. wahtolca* may be keyed with only minor difficulties to *C. villosa* in Palmer's key to the genus *Cinara* in "Aphids of the Rocky Mountain Region." In life the two species are vastly different. *Cinara hirsuta* H&E is also allied to these two species, but *hirsuta* has much longer hair. All three species have similar pigmented spots posterior to the cornicles, but these are less frequent in specimens of *villosa*. Taxonomists who "see" only these, are in for difficulty. *C. hirsuta* will not key to *villosa* in Palmer's key, because of the length of hair. Couplets 17, 18 and 22 are apt to offer difficulties in the keying of some specimens of *wahtolca*. *C. wahtolca* has fewer hair on the tibiae.

Cinara wahtolca H. subspecies *curtiwahtolca* n. subspecies.

Apterous viviparous females of this form, in life, apparently are enough similar to the typical form to be taken for it. Mounted speci-

mens differ from the form as described in the character and length of the hairs on the dorsum of the thorax and abdomen, and in the size and height of the pigmented spots from which they arise. The hair on the dorsum are very fine, arise from a pigmented spot which is not elevated and very small. The hairs are hardly longer than the width of the spots from which they arise, but vary some in length, they are fine and may be difficult to differentiate. The larger pigmented spots anterior to the transverse pigmented spots are as a rule free from hair, when free, they show clear area, which correspond to areas from which hairs arise when such are present. Such hairs are always short, but longer than those found on the dorsum which are about .01 mm. long. The hairs present on the pigmented spots are quite thick, and for the most part dull at the end. The hairs on the ventral surface are normal. Specimens of this form differ from typical specimens of *wahtolca* in the length of various parts of the antennae, legs and rostrum, but it is not known how significant these variations are.

Holotype, apterous viviparous female, deposited in the United States National Museum. Host *Pinus edulis*, Grand Canyon National Park, Arizona, June 15, 1954. The specimens were for the most part collected on small trees growing in the angle formed by the main road into the Park, and the road leading to the Park Air Port. *C. wahtolca* was the most common species of *Cinara* found on *Pinus edulis* in Arizona in early June 1954. It was common and present in great numbers on *Pinus monophylla* in Nevada. *Pinus monophylla* is a new host for this species.

Cinara villosa (G&P) subspecies *curtivillosa* n. subspecies.

This new subspecies of *C. villosa* (G&P) differs from the typical form *C. villosa* in having short hairs on the dorsum of the abdomen, in place of hairs of normal length. In this respect it is similar to the subspecies *C. curtivahtolca* described herewith, except for the fact that the hairs are somewhat longer on the average. Most of the hairs are more or less pointed, they appear to be normal, we do not think they have been worn off or perhaps clipped by ants.

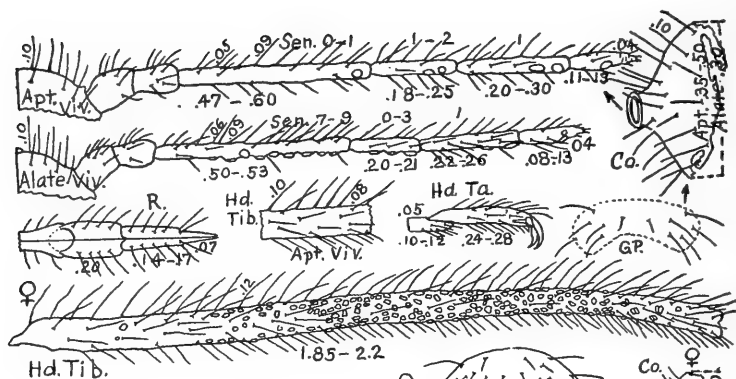
Holotype apterous viviparous female. Taken on *Pinus flexilis* var *reflexa*, July 17, 1954. Summerhaven, Arizona. George D. Butler, Jr., Coll. This slide has been deposited in the United States National Museum.

Cinara juniperivora (Wilson).

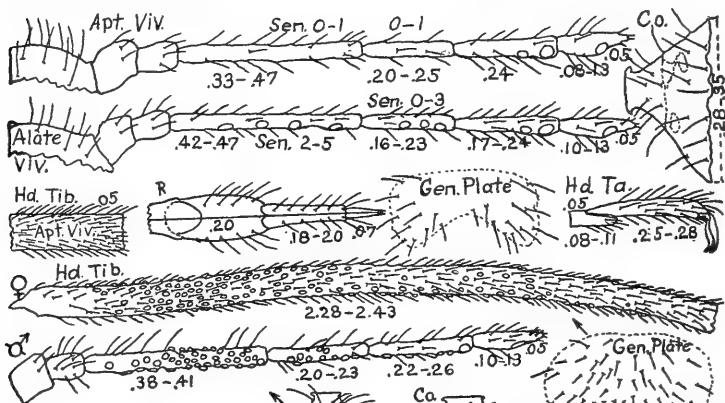
Cinara difficilis H&F 1931 new synonymy.

Explanations of Plates

The descriptions of the forms figured on the plates published herewith, with the exception of the figure of *C. juniperi* (DeGeer) were published in previous volumes of this Journal, either by the writer or the writer and his associates. They have not been figured elsewhere, and none are described in Palmer's "Aphids of the Rocky Mountain Region," either because they were described after this work went to press, or because they are from regions without the limits of this work. The figure of *C. juniperi* (DeGeer) is from a slide now in the collection of Prof. E. O. Essig, which was checked by Dr. Hille Ris Lambers. Records of *C. juniperi* previously published in American literature may be ques-



CINARA wahtolca H.



CINARA pinona H.

PROCEEDINGS

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SOME TINGIDAE FROM THE FRENCH CAMEROONS
(HEMIPTERA)

BY CARL J. DRAKE

This paper is an account of the lacebugs, family Tingidae, netted during an expedition to study the ecology and fauna of the pluvial forests of the French Cameroons, Africa, winter of 1949-1950, by the Universitetets Zoologiske Museum, København. The research investigations and insect collections were made by Dr. Jørgen Burket-Smith (in charge of expedition) and J. Dahl of the above university.

The Tingids, represented by 20 specimens, sort out to two genera and three species. These figures include the species described below as new to science. The specimens, including the type, have been returned to the above museum.

The Tingidae were collected in the pluvial forests and small native "clearings" south of Makak, a small station on the railway between Douala and Yaoundé, about 270 kilometers south of the former city. Field stations were established at "Campement Despierres" (four kilometers south of Makak) and at "Case du Nyong" (12 kilometers south of the first camp) on the southern bank of the river Nyong. At the latter station, a field laboratory was constructed for conducting the ecological studies and making the insect collections. The climate in the region of the stations is that of the calm-belt, a wet tropical one of four seasons.

Phyllontocheila alberti tricarinata Schouteden.

Phyllontocheila alberti tricarinata Schouteden, Rev. Zool. Bot. Afr. 43(3-4):170.

Phyllontocheila alberti tricarinata Drake and Gomez-Menor, EOS, Rev. Esp. Ent. 30(1-2):93. (*New synonymy*)

As the subspecies *P. alberti carinata* Schouteden has priority by a couple of months over the subspecies described by the same name by Drake and Gomez-Menor, the latter is here treated as a synonymy. The description of the subspecies *tricarinata* also makes it necessary to suppress the subgenus *Kotoko* Schouteden as a synonym of the genus *Phyllontocheila* Fieber. (*New synonymy*)

Fifteen specimens (8 adults and 7 nymphs), both field stations south of Makak, feeding and breeding on the leaves of a small tree, *Veronia* sp. Other specimens have been seen from Spanish Guinea and Belgian Congo. Schouteden also reported *Veronia* as its food plant in the Belgian Congo. The typical form has the pronotum unicarinate instead of tricarinate.

Phyllontocheila dilatata (Guérin-Méneville).

OCT 31 1955

Tingis dilatata Guérin-Ménéville, Mag. Zool. 1(2):8. tab. 8, 1831.

Tingis dilatata Lethierry et Severin, Cât. gén. Hem. Het. 3:226. 1896.

Phyllontochila dilatata Distant, Ann. So. Afr. Mus. 2:241. 1902.

Phyllontochila dilatata Horvath, Ann. Mus. Nat. Hung. 9:328 & 331. 1911.

Phyllontochila dilatata Horvath, Kilimandjaro-Meru, 2(12):63.

Four specimens, Case du Nyong, netted in the dense underwood of the forest, along paths and in plantations. Recorded in the literature from Nigeria, Senegal, Rhodesia, Serra Leone, Belgian Congo and French West Africa.

***Tingis nyogana*, n. sp.**

Large, rather broad, ovate, testaceous with pronotum largely reddish fuscous and elytra variegated with fuscous and blackish. Length, 4.50 mm; width, 2.60 mm.

Head broad, very short, black, armed above with five, stout, blunt spines; anterior pair and median erect, beadlike, fuscous; hind pair appressed, testaceous, short; eyes large, reddish fuscous. Bucculae broad, closed in front, mostly triseriate, quadriseriate behind. Rostrum brownish testaceous, extending to base of mesonotum; laminate moderately elevated, rather thick, fuscous, divergent anteriorly, apex destroyed by pin. Antennae moderately stout; segment I very stout, very short; II slenderer, nearly the same length as I; III brownish, straight, clothed with extremely short, golden pubescence; IV, short, black, feebly enlarged apically, clothed with pale pubescence; measurements—I, 14; II, 12; III, 90; IV, 28. Orifice with sides of channel strongly elevated, directed upward with apex nearly in contact with hypocostal laminae. Legs moderately long, moderately stout, reddish fuscous, clothed with very short, inconspicuous pubescence.

Pronotum quite broad, strongly and broadly convex across humeral angles, very coarsely punctate, moderately roundly narrowed anteriorly, tricarinate; carinae elevated, largely testaceous, composed of one row of fairly distinct areolae; lateral carina united with apex of prostrate hood, reaching to apex of hind pronotal process; lateral carinae terminating anteriorly near base of calli, more widely separated in front of disc, there convex within; hood rather small, pyriform, inflated, feebly produced in front, wider than high, longer than wide; calli large, impunctate, black; paranota long, rather narrow, slightly reflexed, with outer margin slowly rounded, brownish testaceous, uniseriate opposite humeri, wider and biseriate in front; hind process large, testaceous, areolate.

Elytra broad, obovate, brownish testaceous, somewhat variegated with fuscous or blackish markings, jointly broadly rounded behind in repose, widest across apex of hind pronotal process; costal area wide, with a fairly large quadrate black band in front of middle, also with a few scattered small spots and apex black, irregularly tri-quadriseiate; subcostal area subequal to costal in width, quadriseiate in front, triseriate behind, with outer boundary sinuate, acutely angulate at base and apex, extending beyond middle of elytra, widest opposite apex of hind pronotal process; there seven or eight areolae deep; sutural area large, with veinlets largely black, the areolae larger apically. Areolae of elytra rather small and not arranged in very regular rows. Abdomen beneath dark reddish fuscous.

Type (female), Case du Nyong, along a path in the cultivated clearings and plantations, Zool. Mus. of Univ. København.

This species may be distinguished from other members of the genus *Tingis* Linneaus (subgenus *Tingis*) by the hood and paranota. The genus *Tingis* and subgenera need further study as a number of species so classified are atypical.



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TWO NEW SPECIES OF SHORE-BUGS (HEMIPTERA)
(SALDIDAE: LEPTOPODIDAE)

BY CARL J. DRAKE

The present paper characterizes two new shore-bugs—one species of the family Saldidae from the Solomon Islands and the other of the family Leptopodidae from Madagascar.

Pentacora sororia, n. sp.

Small, obovate, dusky testaceous, rather dull, with the color areas of brown, fuscous or black variable in size, intensity and indefinite in pattern as discussed in description of structures. Length, 3.75 mm. (male) and 4.25 mm. (female); width, 1.62 mm. (male) and 2.12 mm. (female).

Head testaceous with a fuscous or blackish bifid area bearing ocelli, sometimes most of vertex and postocular part blackish; ocelli prominent, separated by less than the diameter of an ocellus. Rostrum long, dark fuscous, shining, extending between hind coxae. Antennae long, slender, testaceous with last two segments dark or blackish fuscous, shortly hairy, with pubescence also on last two segments, measurements—I, 28; II, 62 (male) and 74 (female); III, 42; IV, 42.

Pronotum moderately convergent anteriorly, with outer margins nearly straight; callus large, moderately elevated, with large discal impressions; collar short, narrow, testaceous; hind lobe about one-half as long as callus (10:22), deeply roundly excavated behind, width at base much greater than width of front margin of anterior lobe (115:65), or median length of entire pronotum (115:38). Scutellum very little raised, often mostly black with apex testaceous, the width at base and median length almost equal (74:70). Hemelytra variable in color, flavotestaceous with veins fuscous, or with fuscous and blackish areas that are somewhat variable in size, intensity of color markings and blackish veins; membrane pale in testaceous forms, mostly fuscous in darker forms, divided into five cells. Legs dusky testaceous or whitish testaceous, the femora with some small fuscous spots. Hind legs with tibiae much longer than femora (128:90). Measurements: 80 units equal one millimeter.

Type (male) and *allotype* (female), Malaupaina, Three Sisters, Solomon Islands, May 12, 1934, B. A. Lever, British Museum. *Paratypes*: 5 specimens, same data as type.

As *P. sororia* n. sp. is very closely allied to *P. sphacelata* (Uhler) and *P. sonneveldi* Blöte in color, markings and general aspect, the three species are easily confused. *P. sonneveldi* is clothed with distinctly longer pubescent hairs than the other two species. *P. sororia* is smaller,

shorter hind tibiae (128:150) and slightly longer pubescence than *P. sphacelata*. *Sonneveldi* has been reported in the literature from the Celebes and Malay. *P. sphacelata* is widely distributed in North, Central and Insular Americas. It is primarily a tenant of wet sandy and muddy shores near the water's edge of salt and brackish marshes, swamps, tidal flats and ponds of the seacoast (Atlantic, Pacific and Gulf), also of inland salt lakes, springs and wells. Seashores, where high waves break on the beaches and leave heavy pounding surf, make conditions impossible for their existence. Specimens from the light-colored sands of West Indies are usually very pale in color. It has also been taken in Peru.

Martiniola pulla, n. sp.

Large, oblong-ovate, black with testaceous and flavotestaceous markings as described with structures. Length, 4.75 mm.; width, 1.95 mm.

Head black, with a median longitudinal furrow in front of ocellar tubercle, with two pairs of erect spines (one on each side of furrow; first pair between eyes and second pair slightly in front of eyes) and three upright spines on top of anterior tubercle testaceous, each side with three extremely long, pale testaceous, laterally-projecting spines, beneath with numerous, white, setalike hairs; ocelli placed obliquely on top of ocellar tubercle, separated by less than the diameter of an ocellus. Rostrum black-fuscous with apex of first segment testaceous, beset with several, long, white, setal hairs; segment I with three extremely long, laterally-directed, pale testaceous spines on each side; II with two much shorter pale spines on each side. Antennae very long, slender, without pubescence, blackish fuscous; segment I short, distinctly flattened, with two or three, short, white spines on each side; II slightly thicker than next two; III and IV quite slender, measurements—I, 21; II, 85; III, 80; IV, 50.

Pronotum rugulose, coarsely punctate, black with five or six small pale spots, beset with numerous, erect or suberect, whitish spinulae or setal hairs; front lobe constricted, much narrower than hind lobe (80:110), shorter than hind lobe (35:45); collar short, narrow, constricted; hind lobe truncate behind, higher and more convex than front lobe, beset with some whitish setal hairs. Scutellum wider at base than median length (60:40), black with apex and a small elevated callus on each side at middle flavotestaceous. Hemelytra blackish, with two sub-basal stripes in clavus (one on each side), a submedian stripe in inner corium, and a large subbasal spot, another spot scarcely back of the middle and a divided subapical spot flavotestaceous; embolium moderately wide at base, then narrowed posteriorly, whitish, with outer boundary vein thick, dark fuscous, and armed on exterior margin with a row of moderately long, sharp, whitish spines resting on fuscous bases; membrane dark fuscous, composed of four cells. Thorax beneath blackish with acetabula whitish; venter whitish, with bases of segment fuscous. Elytral spinulae erect or suberect, brownish or fuscous. Hypocostal laminae uniseriate on about basal half, thence narrower and without areolae.

Legs long, slender, with all femora strongly tapering apically, black, the inferior surfaces of all femora and basal part of their dorsal sur-

faces whitish testaceous; all tibiae and all femora with a subapical, flavotestaceous band. Anterior femora armed beneath with six pairs of extremely long, slender, divergent spines (six spines on front and six on hind edge), the three basal pairs black and three apical pairs whitish testaceous; underside of tibiae also armed with six pairs of shorter, black, divergent spines. Middle and hind femora each with a row of very short, whitish spines on hind margin.

Type (female), Tamatave, Madagascar, 1949, in Drake Collection.

Separated from its congener *M. madagascarensis* (Martin) by larger size, black color, banded femora and tibiae (subapical) and shorter fourth antennal segment.

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

SEVEN NEW BIRDS FROM CERRO DE LA NEBLINA,
TERRITORIO AMAZONAS, VENEZUELA

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

Cerro de la Neblina, the type locality of the birds described in this paper, is located in extreme southern Venezuela near the Brazilian frontier, lat. 1° N, long. 66° W. An ornithological collection was made there by the expedition of the Phelps Collection which joined, at Cerro de la Neblina, a New York Botanical Garden expedition, which had preceded us there, headed by Dr. Bassett Maguire.¹

Besides the new birds described, we report the first breeding records for Venezuela of four species of *Laridae* and the extension of the range of a tanager from Columbia to Venezuela.

Specimens listed are in the Phelps Collection, Caracas, unless otherwise specified. Names of colors are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature," 1912. Wing measurements are of the chord.

We are indebted to Dr. John T. Zimmer, Chairman of the Department of Birds of the American Museum of Natural History, for access to the collection of that institution.

Larus atricilla atricilla Linné

Larus atricilla Linné, Syst. Nat., ed. 10, 1, p. 136, 1758. (America-Bahama Islands, *ex* Catesby.)

A nestling collected by us on July 25, 1953, on Isla Sarquí, of Los Roques archipelago, is the first definite breeding record on any of the islands in the Caribbean Sea off the Venezuelan coast, either Venezuelan or Dutch.

Hellmayr records it as breeding south through the Lesser Antilles to the Grenadines. Voous² reports it as probably nesting on Klein Curaçao and Bonaire, but this remains to be established definitely.

Sterna dougallii dougallii Montagu

Sterna Dougallii Montagu, Orn. Dict. Suppl., 1813. (Scotland.)

This species had not been recorded as breeding on the Venezuelan islands of the Caribbean Sea. We found it nesting, with eggs, on June 26, 1954, on Isla Noronquí, of Los Roques archipelago. It is known

¹ Maguire, B. Cerro de la Neblina. A newly discovered sandstone mountain. Geographical Review, New York. XLV, No. 1, pp. 1-26, January, 1955.

² Vogels Nederl. Antillen, 1955, pp. 97-98.

to breed on Aruba Island, Curaçao, (Jan Thiel Baai)³ and the Grenadines.

Thalasseus maximus maximus Boddaert

Sterna maxima Boddaert, Table Pl. enlum., p. 58, 1783. (Cayenne, ex Daubenton, pl. 988.)

This species had not been recorded as breeding on any of the Dutch or Venezuelan islands of the Caribbean Sea off the Venezuelan coast. A specimen, sitting on an egg, was collected by us on June 26, 1954, on Isla Noronquí of Los Roques archipelago.

According to Bond, it breeds throughout the West Indies but he does not include the islands off the Venezuelan coast in his West Indian range.

Thalasseus eurygnatha Saunders

Sterna eurygnatha Saunders, Proc. Zool. Soc. London, p. 654, 1876. (Santa Catharina, Brazil.)

This species had not been recorded as breeding on the Venezuelan islands of the Caribbean Sea. We collected two specimens sitting on their eggs on June 26, 1954, on Isla Noronquí of the Los Roques archipelago. Bond does not record the species from the West Indies, but recently Voous has reported it as nesting in Curaçao.

***Xiphocolaptes promeropirhynchus neblinae*, new subspecies**

Type: From Cerro de la Neblina, headwaters of the Río Yatúa, Territorio Amazonas, Venezuela; 1800 meters. No. 59988, Phelps Collection, Caracas. Adult male collected January 24, 1954, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Nearest to *X. p. orenocensis* Berlepsch and Hartert, of the upper Orinoco, Ecuador and Perú, from which it differs by having a chestnut tinge on the mantle, darker tail, the striped throat of *X. p. tenebrosus* Zimmer and Phelps, of the Gran Sabana region of Bolívar, darker brown under parts and shorter wing; from *tenebrosus* differs by the chestnut tinge on the mantle, darker tail and the more curved, longer and heavier bill of *orenocensis*.

Range: Known from the unique type from the Subtropical Zone, in deep forest.

Description of Type: Top of head dusky brown, the feathers with buffy white shaft lines which are more rufous on forehead and lores; back Brussels Brown, the shafts of feathers buffy, giving a fine lined appearance; mantle with a chestnut tinge; rump Auburn merging into the Chestnut of upper tail-coverts; sides of head pale buffy streaked with dark brown. Chin pale buffy; upper throat pale buffy with the feathers heavily edged with brownish giving a striped appearance, this merging into the Brussels Brown of the lower throat, breast, sides and flanks, the feathers of which have long narrow buffy white shaft lines; lower abdomen paler with some dusky speckling; under tail-coverts Brussels Brown indistinctly speckled with dusky. Remiges Auburn, under surfaces paler; inner vanes of primaries dusky apically; under surfaces of secondaries pinkish buffy basally; upper wing-coverts more

³ Hartert. Ibis. p. 310, 1893; Voous, Vogels Nederl. Antillen, 1955, p. 101.

brownish; lesser coverts with buffy shafts; under wing-coverts and axillaries buffy, heavily barred with dusky. Tail Caron Brown, paler on under surface; shafts of rectrices very dark brown, light brown on under surfaces.

Bill (in life) "black, gray base"; feet "olive"; iris "dark." Wing, 130 mm.; tail, 120; exposed culmen, 48; culmen from base, 54; tarsus, 30.

Remarks: Range of measurements: *orenocensis*: five adult males (inc. type)—wing, 137-143 (139.4) mm.; tail, 106-118 (111.8); culmen from base, 54-56 (55.2); four adult females—wing, 131-139 (135.5); tail, 110-115 (113); culmen from base, 55-57 (56); *tenebrosus*: one adult male—wing, 125; tail, 109; culmen from base, 47.5; two adults of undertermined sex (inc. type)—wing, 121, 130; tail, 93, ♀; culmen from base, 48, 49.

Orenocensis in Venezuela is known only from the lower Tropical Zone and *tenebrosus* from the upper Tropical Zone (700 to 1000 meters), while the new form was collected well up in the Subtropical Zone at 1800 meters.

Specimens Examined

*X. p. emigrans*⁴.—NICARAGUA: 1. GUATEMALA: 4.

X. p. costaricensis.—COSTA RICA: 6⁴.

X. p. panamensis.—PANAMÁ: 4⁴

X. p. promeropirhynchus.—COLOMBIA: 12⁵. VENEZUELA: 9⁴; 16⁶; Zulia: Cerro Pejochaina, Perijá, 4 ♂, 2 ♀; Cerro Mashirampé, 1 ♀, 1 (♀); Campamento Avispa, 1 ♂; Cerro Alto del Cedro, 1 ♂, 4 (♀) juv.

X. p. virgatus.—COLOMBIA: 4⁵.

X. p. sanctae-martae.—COLOMBIA: 9⁵.

X. p. procerus.—VENEZUELA: 12⁴; 24⁶; Guárico: Santa María de Ipire, 1 ♂.

X. p. orenocensis.—VENEZUELA: Terr. Amazonas: San Fernando de Atabapo, 3 ♀; Yapacana, 1 ♂; Nericagua, 1 ♂ (type)⁷; Munduapo⁷, 1 ♀, 1 (♀); El Merey, 1 ♂⁷. ECUADOR: 1⁴. PERÚ: 1⁴.

X. p. neblinae.—VENEZUELA: Cerro de la Neblina, Terr. Amazonas, 1 ♂ (type).

X. p. tenebrosus.—VENEZUELA: Arabupú, Cerro Roraima, 1 ♂; Cerro Chimantá-tepui, 2 (♀) (inc. type).

X. p. ignotus.—ECUADOR: 10⁵.

X. p. crassirostris.—PERÚ: 3⁵.

X. p. phaeopygas.—PERÚ: 1⁵.

X. p. berlepschi.—BRAZIL: 4⁴.

X. p. lineatocephalus.—BOLIVIA: 9⁴.

Glyphorhynchus spirurus coronobscurus, new subspecies

Type: From Cerro de la Neblina, headwaters of the Río Yatúa, Territorio Amazonas, Venezuela; 1400 meters. No. 59991, Phelps Collection,

⁴ Specimens in the American Museum of Natural History. For localities see Zimmer and Phelps, Am. Mus. Nov., No. 1373, p. 4, 1948.

⁵ Idem. For localities see Zimmer, Am. Mus. Nov., No. 753, p. 13, 1934.

⁶ For localities see Zimmer and Phelps, Am. Mus. Nov., No. 1373, p. 4, 1948.

⁷ Specimens in the American Museum of Natural History.

Caracas. Adult male collected February 1, 1954, by Ramón Urbano. (Type on deposit in the American Museum of Natural History.)

Diagnosis: Differs from all races of *G. spirurus* by darker, more dusky brown, crown; nearest to *G. s. rufigularis* Zimmer from which it differs additionally by more olivaceous, less brownish, under parts.

Range: Known from four specimens from Cerro de la Neblina in the Subtropical Zone at altitudes from 1400 to 1800 meters.

Description of Type: Crown Raw Umber, forehead more dusky; back nearest to Cinnamon-Brown, merging into the Burnt Sienna X Chestnut or uropygium; superciliaries and sides of head streaked with buffy white. Chin and throat browner than Zinc Orange, some of the feathers with dusky tips; breast, sides and flanks Saccardo's Umber, breast with buffy white saggitate shaft-spots; abdomen paler; under tail-coverts nearest to Sayal Brown. Wings Fuscous; exposed surfaces of upper wing-coverts uniform with back, those of primaries and secondaries more olivaceous and those of tertiaries Auburn; inner webs of secondaries and all but the three outer primaries with a broad band of Light Pinkish Cinnamon; under wing-coverts white, a brownish area on carpal angle; axillaries whitish. Tail Auburn, paler on under surface.

Bill (in life) "black, base purple"; feet "purplish gray"; iris "dark." Wing, 72.5 mm.; tail, 67; exposed culmen, 11; culmen from base, 13; tarsus, 16.5.

Remarks: Sexes alike in color but female smaller. Size similar to *rufigularis*. Range of measurements: two adult males (inc. type)—wing, 71-72.5 (71.7) mm.; tail, 65-65 (65); culmen from base, 13-13 (13); one adult female—wing, 64; tail, 57; culmen from base, 12; one adult of undetermined sex—wing, 62; tail, 59; culmen from base, 12. Measurements of *rufigularis*: see Zimmer, Peruvian Birds.⁸

The other races in Venezuela are of the Tropical Zone, sometimes reaching the lower subtropics.

Specimens Examined

*G. s. pectoralis*⁹.—MEXICO: 1. GUATEMALA: 1.

*G. s. sublestus*¹⁰.—COSTA RICA: 3. PANAMA: 14. COLOMBIA: 18; ECUADOR: 10.

G. s. integratus.—COLOMBIA⁷: Puerto Boyacá, 1 ♂; north of Cúcuta, 1 ♀; "Bogotá," 1 ♂. VENEZUELA: La Sierra, Perijá, Zulía, 1 ♂; La Fría, Táchira, 2 ♂; Santo Domingo, 1 ♂; Santa Bárbara, Barinas, 1 ♀.

G. s. spirurus.—VENEZUELA: 51¹¹. BRITISH GUIANA: 28¹⁰; 1¹¹. FRENCH GUIANA: 15⁹. BRAZIL: 2¹¹; 47¹⁰. ECUADOR: 7¹⁰.

G. s. amacurensis.—VENEZUELA: 16¹¹.

G. s. rufigularis.—VENEZUELA: 133¹¹; 77¹⁰.

G. s. coronobscurus.—VENEZUELA: Cerro de la Neblina, Terr. Amazonas, 2 ♂ (inc. type), 1 ♀, 1 [♀].

*G. s. castelnaudi*¹⁰.—PERÚ: 39. ECUADOR: 8. BRAZIL: 17.

G. s. albigularis.—BOLIVIA: 2¹⁰.

⁸ Am. Mus. Nov., No. 757, p. 3, 1934.

⁹ Specimens in the American Museum of Natural History. For localities see Phelps and Phelps, Jr., Proc. Biol. Soc. Wash., 65, pp. 47, 48, 1952.

¹⁰ Idem. For localities see Zimmer, Am. Mus. Nov., No. 757, pp. 6, 7, Nov. 30, 1934.

¹¹ For localities see Phelps and Phelps, Jr., Proc. Biol. Soc. Wash., 65, p. 47, 1952.

G. s. inornatus.—BRAZIL: 10¹⁰.

G. s. cuneatus.—BRAZIL: 31¹⁰.

***Platyrrinchus mystaceus ventralis*, new subspecies**

Type: From Cerro de la Neblina, headwaters of the Río Yatúa, Territorio Amazonas, Venezuela; 1900 meters. No. 60108, Phelps Collection, Caracas. Adult male collected January 24, 1954, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Nearest to *P. m. ptaritepui* Zimmer and Phelps, but differs from all races of *mystaceus* by brighter, darker, more ochraceous breast and abdomen, less buffy or brownish. From *P. m. duidae* Zimmer, differs more than from *ptaritepui* as the former is still duller.

Range: Known from Cerro de la Neblina in the Subtropical Zone, in the deep forest.

Description of Type: Top of head Brownish Olive X Light Brownish Olive, with a semi-concealed Empire Yellow crown patch; back and rump Medal Bronze, more buffy on upper tail-coverts; lores, wide post-ocular and mystacial stripes blackish; auricular region buffy. Chin and throat white with lateral edges buffy; anterior breast, sides and flanks Buckthorn Brown, merging into the Yellow Ochre of posterior breast and abdomen; under tail-coverts buffy. Wings darker than Benzo Brown; remiges edged externally with olive brown, more widely on tertials; inner vanes of remiges edged with buffy, basally; upper wing-coverts, except primary ones, broadly but faintly edged with brownish olive; bend of wing Yellow Ochre; under wing-coverts mixed buffy and dusky; axillaries buffy. Tail darker than Benzo Brown.

Bill (in life) "maxilla black, mandible yellow"; feet "yellowish flesh"; iris "brown." Wing, 55 mm.; tail, 28; exposed culmen, 10; culmen from base, 14; tarsus, 16.5.

Remarks: Sexes different in color and male with longer wing. Size similar to *ptaritepui*. Range of measurements: two adult males (inc. type)—wing, 55, 54 mm.; tail, 28, 29; culmen from base, 14, 13; five adult females—wing, 50-52 (50.7); tail, 24-27 (25.8); culmen from base, 13.5-14 (13.8).

Another of our specimens is immature as shown by the rufous tinge of the back.

Specimens Examined

P. m. mystaceus.—BRAZIL: 20¹².

P. m. bifasciatus.—BRAZIL: 14¹².

*P. m. zamorae*¹².—PERÚ: 6. ECUADOR: 11.

P. m. albogularis.—ECUADOR: 17¹².

P. m. insularis.—TOBAGO: 10¹². TRINIDAD: 10¹². VENEZUELA: 17¹³. Lara: Cerro El Cogollal, 1 ♀; Cerro El Cerrón, 1 ♀. Yaracuy: Palma Sola, 1 ♂. Carabobo: Urama, 1 ♂, 3 ♀; Las Quiguas, 1 ♀; Colonia Chirgua, 1 ♂. Distrito Federal: San José de los Caracas, 1 ♂, 1 ♀. Miranda: Carenero, 1 ♂; Cerro Golfo Triste, 1 ♀; Cerro Negro, 2 ♂. Anzoátegui: Barcelona, 2 ♀. Sucre: Cerro Pan de Azúcar, 1 ♀; Cerro Papelón, 1 ♂; Cerro Azul, 8 ♂, 1 ♀. Guárico: Altigracia de

¹² For localities see Zimemr, Am. Mus. Nov., No. 1043, p. 8, 1939. Specimens in American Museum of Natural History.

¹³ For localities see Zimmer and Phelps, Am. Mus. Nov., No. 1312, p. 14, 1946. Specimens in American Museum of Natural History.

Orituco, 1 ♀. Bolívar: Santa Rosalía, 1 ♀. Delta Amacuro: Misión Araguaímujo, 3 ♂, 2 ♀.

P. m. imatacae.—VENEZUELA: Bolívar: Cerro Tomasote, 2 ♂, 4 ♀.

P. m. ptaritepui.—VENEZUELA: Bolívar: Cerro Ptari-tepui, 3 ♂, 6 ♀, 1 juv.; Cerro Sororopán-tepui, 2 ♂, 1 ♀; Cerro Aprada-tepui, 1 ♂, 1 ♀.

P. m. duidae.—VENEZUELA: Bolívar: Cerro Roraima, 1 ♀⁷; Arapobó, 3 ♂, 3 ♀, 2 ♀⁷; Paulo, 1 ♂⁷; Santa Elena, 1 ♂. Amazonas: Cerro Duida, 1 ♂⁷; Cerro Yaví, 1 ♀.

P. m. ventralis.—VENEZUELA: Amazonas: Cerro de la Neblina, 2 ♂ (inc. type), 5 ♀, 1 juv.

*P. m. neglectus*¹².—COLOMBIA: 6. PANAMÁ: 26. COSTA RICA: 11.

*P. m. dilutus*¹².—COSTA RICA: 6. NICARAGUA: 8.

*P. m. cancrominus*¹².—NICARAGUA: 8. GUATEMALA: 9.

Troglodytes rufulus wetmorei, new subspecies

Type: From Cerro de la Neblina, headwaters of the Río Yatúa, Territorio Amazonas, Venezuela; 1850 meters. No. 60183, Phelps Collection, Caracas. Adult male collected—January 22, 1954, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from all other races of *T. rufulus* by pure unmixed gray throat, breast and abdomen, instead of whitish or rufous; dark olive brown flanks, instead of rufous; very prominently barred dusky and whitish under tail-coverts, instead of faintly barred rufous ones; darker, more brownish, upper parts and whitish superciliaries, instead of buffy rufous.

Range: Known only from the Subtropical Zone of Cerro de la Neblina at altitudes from 1800 to 1900 meters, in forest and open scrubby country.

Description of Type: Top of head, back and uropygium nearest to Chestnut-Brown X Auburn; lores and sides of forehead gray; a wide superciliary stripe, extending to neck, whitish; auriculars dusky and buffy brown. Chin nearest to Pale Olive-Gray, faintly barred with dusky; throat and breast nearest to Pale Olive-Gray; abdomen more whitish; flanks Prout's Brown X Cinnamon-Brown; under tail-coverts buffy whitish, heavily barred with blackish. Wings nearest to Cinnamon-Drab X Benzo Brown; outer webs of several outermost primaries faintly barred basally with buffy; outer webs of tertials chestnut brown barred with dusky; the innermost one completely barred; upper wing-coverts heavily margined with chestnut brown; bend of wing grayish white; under wing-coverts and axillaries dusky grayish. Tail buffy brown, finely barred with dusky, paler on under surface.

Bill (in life) "black, base flesh color"; feet "blackish brown"; iris "brown." Wing, 52.5 mm.; tail, 32; exposed culmen, 14; culmen from base, 18; tarsus, 23.

Remarks: Sexes alike. Size not different from the other subspecies, having the short wing of *T. r. yavii* Phelps and Phelps, Jr., and the long bill of *T. r. flavigularis* Zimmer and Phelps. Range of measurements: five adult males (inc. type)—wing, 52.5-54 (53.1) mm.; tail, 32-39 (36.4); culmen from base, 18-19 (18.4); three adult females—wing, 51-53 (52); tail, 33-37 (35.3); culmen from base, 18-19 (18.5).

Measurements of *T. r. duidae* Chapman, from Mt. Duida¹⁴: five males—wing, 55-59; tail, 37-41; culmen, 17-17.5; five females—wing, 54-57; tail, 37-38; culmen, 16-17.

This form has strikingly different coloration throughout than the other five known races, which all resemble each other more or less closely. However, as there is no difference in pattern, only color, and as it is manifestly a representative of *T. rufulus*, we prefer not to give it specific rank.

It is with great pleasure that we name this new form in honor of Dr. Alexander Wetmore, fellow member of the Cerro de la Neblina expedition, who always has placed entirely and unreservedly at our disposition his incomparable ornithological knowledge and experience.

Specimens Examined

T. r. rufulus.—VENEZUELA: cerros Roraima, Uei-tepui, Aprada-tepui and Chimantá-tepui, 31¹⁵; Cerro Roraima, 16 ♂, 10 ♀, 2 (?); Cerro Cuquenán, 7 ♂, 7 ♀, 3 (?).

T. r. fulvicularis.—VENEZUELA: cerros Auyan-tepui, Ptari-tepui and Sororopán-tepui, 19¹⁵.

T. r. duidae.—VENEZUELA: cerros Duida and Paraque, 28¹⁵; Cerro Duida, 2 ♂, 1 ♀; Cerro Parú, 9 ♂, 2 ♂ juv., 1 ♀, 2 (?); Cerro Huachamacare, 5 ♂, 4 ♀, 5 (?).

T. r. yavii.—VENEZUELA: cerros Sarisariñama and Yaví, 2¹⁵; Cerro Guanay, 3 ♂, 3 ♀, 3 (?).

T. r. wetmorei.—VENEZUELA: Cerro de la Neblina, 5 ♂ (inc. type), 3 ♀, 1 (?).

Turdus olivater kemptoni, new subspecies

Type: From Cerro de la Neblina, headwaters of the Río Yatúa, Territorio Amazonas, Venezuela; 1800 meters. No. 60204, Phelps Collection, Caracas. Adult male collected January 30, 1954, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from *T. o. roraimae* Salvin and Godman, *T. o. duidae* Chapman and *T. o. paraquensis* Phelps and Phelps, Jr., by darker abdomen, more grayish brown, less yellowish ochraceous; from *T. o. olivater* (Lafresnaye) of northern Venezuela the male differs greatly by lacking the extensive solid black throat; and from *T. o. sanctae-martae* (Todd) and *T. o. caucae* (Chapman) of Colombia by darker upper and lower parts.

Range: Known only from Cerro de la Neblina in the Subtropical Zone at altitudes from 950 to 1850 meters, in forest and open serrubby country.

Description of Type: Top and sides of head black with a slight brownish tint; back and uropygium Brownish Olive X Light Brownish Olive; chin brownish black, merging into the Light Brownish Olive throat which is heavily streaked with brownish black; breast Light Brownish Olive, the sides and flanks more Buffy Brown; abdomen more buffy; thighs and under tail-coverts Mummy Brown, the latter very faintly margined with light brown. Wings Fuscous X Benzo Brown; primaries

¹⁴ Chapman. Am. Mus. Nov., No. 380, p. 22, 1929.

¹⁵ For number and sex see Phelps and Phelps, Jr., Proc. Biol. Soc. Wash., 62, pp. 118-119, June 20, 1949.

narrowly edged with grayish olive; secondaries and tertials heavily margined with brownish olive uniform with back; primary wing-coverts dusky olive; outer webs of greater coverts, and entire lesser coverts, brownish olive uniform with back; under wing-coverts and axillaries buffy olive. Tail Bone Brown, paler on under surface.

Bill (in life) "orange yellow"; feet "brownish yellow"; iris "brown." Wing, 125.5 mm.; tail, 105; exposed culmen 22; culmen from base, 28; tarsus, 35.

Sexes unlike in color; male has longer wings and tail; size similar to *duidae*. Range of measurements: five adult males (inc. type)—wing, 125-130 (127.5) mm.; tail, 102-107 (104.4); culmen from base, 26-28 (26.9); five adult females—wing, 119-124 (121.4); tail, 96-102 (98.4); culmen from base, 26-28 (27). Measurements of *duidae* from Cerro Duida, in American Museum of Natural History¹⁶: wing, 122-133 (126); tail, 102-119 (109); culmen from base, 25-28.5 (27.1).

Female differs in color from male by having a less blackish head, more olivaceous; the throat is less heavily striped and the breast is paler.

A large collection of fresh topotypical skins of *T. o. roraimae*, from Mt. Roraima, made after the original description of *T. o. ptaritepui* Phelps and Phelps, Jr.¹⁷, shows that *ptaritepui* is not different from *roraimae*, so we synonymize it.

We dedicate this new bird to our friend Dr. James H. Kempton, who accompanied us to Cerro de la Neblina. The vast field experience of this eminent agricultural expert and his good humored companionship contributed greatly to the success of the expedition.

Specimens Examined

T. o. roraim.—VENEZUELA: cerros Roraima, 31 ♂, 9 ♂⁷, 16 ♀, 1 (♀); Cuquenán, 14 ♂, 10 ♀; Uei-tepui, 19 ♂, 1 ♂ juv., 11 ♀, 1 ♀ juv., 1 (♀), 1 (♀) juv.; Ptari-tepui, 1 ♂, 1 ♂ juv., 6 ♀; Sororópante-pui, 1 ♀; Chimantá-tepui, 2 ♂, 6 ♀; Uaipán-tepui, 10 ♂, 9 ♀; Aprada-tepui, 10 ♂, 7 ♀, 4 (♀); Auyan-tepui, 4 ♂⁷, 1 ♀, 1 ♀⁷.

T. o. duidae.—VENEZUELA: cerros Duida, 2 ♂, 7 ♂⁷, 4 ♀, 7 ♀⁷; Huachamacare, 5 ♂, 3 ♀, 1 (♀); Yaví, 13 ♂, 1 ♂ juv., 8 ♀; Parú, 3 ♂, 3 ♀.

T. o. paraquensis.—VENEZUELA: Cerro Paraque, 7 ♂, 7 ♀, 1 (♀).

T. o. kemptoni.—VENEZUELA: Cerro de la Neblina, Territorio Amazonas, 9 ♂ (inc. type), 12 ♀.

T. o. olivater.—VENEZUELA: Zulia: La Sabana, Perijá, 3 ♂, 1 ♀, 1 (♀); Kunana, 1 ♂; Cerro Pejochaina, 2 ♂; Barranquilla, 1 ♂. Táchira: Las Delicias, Páramo de Tamá region, 1 ♀. Falcón: San Luis, 2 ♂; Curimagua, 5 ♂, 1 (♀). Lara: Cerro El Cerrón, 5 ♂, 1 ♂ juv., 3 ♀; Cerro El Cogollal, 1 ♂, 1 ♀ juv.; Cubiro, 1 ♂ juv., 1 ♀. Barinas: Altamira, 2 ♂. Yaracuy: Bucaral, 1 ♂. Carabobo: Sierra de Carabobo, 2 ♂ juv., 1 ♀ juv.; Cumbre de Valencia⁷, 5 ♂, 2 ♀. Aragua: Colonia Tovar, 5 ♂, 1 ♀, 2 ♀⁷; Cerro Golfo Triste, 1 (♀). Distrito Federal: El Junquito, 10 ♂, 1 ♀; Galipán⁷, 4 ♂, 2 ♀; Cotiza, 1 ♀⁷. Miranda: Curupao, 3 ♂; Cerro Negro, 1 (♀).

¹⁶ See Chapman Am. Mus. Nov., No. 380, pp. 23, 24, Oct. 21, 1929.

¹⁷ See Descripción de Cuatro Aves Nuevas de los cerros Paraque y Ptari-tepui y Notas sobre *Bubulcus ibis*, *Myioborus cardonai* y *Platycichla leucops*. Bol. Soc. Ven. Cien. Nat., No. 67, pp. 231-232, 1946.

T. o. sanctae-martae.—COLOMBIA: Valparaíso, Santa Marta⁷, 3 ♂, 2 ♀, 4 (?).

T. o. caucae.—COLOMBIA⁷: Cauca: La Sierra, 1 ♂, 1 ♀; Cauca, 1 ♂.

Chlorospingus canigularis canigularis (Lafresnaye)

Tachyphonus canigularis Lafresnaye, Rev. Zool., 11, p. 11, 1848. ("Bogotá".)

Táchira: 1 ♂, 1 ♀, Cerro El Teteo, Burgua; 1250 meters.

These specimens constitute an extension of range of the species from the western slopes of the Eastern Andes of Colombia to the south-eastern approaches to the Páramo de Tamá, in the Venezuelan Andes, about 25 kilometers from the Colombian boundary. They were compared with 14 specimens from Colombia in the American Museum of Natural History.

Atlapietes personatus jugularis, new subspecies

Type: From Cerro de la Neblina, headwaters of the Río Yatúa, Territorio Amazonas, Venezuela; 1800 meters. No. 60339, Phelps Collection, Caracas. Adult male collected January 30, 1954, by Ramón Urbano. (Type on deposit at American Museum of Natural History.)

Diagnosis: Nearest to *A. p. duidae* Chapman, of Cerros Duida and Guaiquinima, from which it differs, as well as from *A. p. parui* Phelps and Phelps, Jr., of Cerro Parú, by lighter rufous throat; from the other races of *personatus* differs more greatly because it has the rufous color entirely covering the throat and breast.

Range: Known only from Cerro de la Neblina.

Description of Type: Top and sides of head and nape Chestnut, merging into the Burnt Sienna of throat and breast; back and uropygium black, the upper tail-coverts faintly tinged with olivaceous. Abdomen Lemon Chrome merging into the dusky olivaceous sides, flanks, thighs and axillaries; under tail-coverts dusky edged with yellowish olive. Remiges Fuscous and Benzo Brown with under surface paler and outer vanes lightly edged externally with brownish white; margins of inner vanes pale grayish; upper wing-coverts black; bend of wing Chrome Yellow; under wing-coverts grayish. Tail black.

Bill (in life) "black, base brown"; feet "blackish brown"; iris "chestnut brown." Wing, 80 mm.; tail, 83; exposed culmen, 14.5; culmen from base, 16.5; tarsus, 29.

Remarks: Sexes alike in color but females have shorter wings and tail. Size similar to *duidae*. Range of measurements: five adult males—wing, 80-82.5 (80.7) mm.; tail, 80-84 (82.4); culmen from base, 16.5-17.5 (17); three adult females—wing, 71-76.5 (74.4); tail, 71-79 (74.7); culmen from base (2), 17, 17. Measurements of *duidae*, from Mt. Duida⁷: five adult males—wing, 77-80 (79.2); tail, 79-88 (81.8); culmen from base, 16-17 (16.8); three adult females—wing, 74-83 (76.2); tail, 70-79 (75.2); culmen from base, 17-17 (17).

Remarks: Description of juvenile. Top of head mixed brownish, chestnut and olivaceous instead of Chestnut; back brownish, mottled with black, instead of black; chin and throat largely yellowish olive mixed with some of the Burnt Sienna of breast.

Specimens Examined

A. p. personatus.—VENEZUELA: cerros Roraima, 10¹⁸, 20 ♂, 18 ♀, 6 (?); Cuquenán, 9 ♂, 9 ♀, 3 (?); Ptari-tepui, 22¹⁸; Sororopán-tepui, 2 ♀; Chimantá-tepui, 28¹⁸; Aprada-tepui, 11¹⁸; Acopán-tepui, 6¹⁸.

A. p. collaris.—VENEZUELA: Cerro Auyan-tepui, 1 ♀.

A. p. paraquensis.—VENEZUELA: cerros Paraque, 16¹⁸; Camani, 5 ♂, 3 ♀, 1 (?), 1 juv. (?); Guanay, 10 ♂, 5 ♀, 4 (?).

A. p. parui.—VENEZUELA: Cerro Parú, 24¹⁸.

A. p. duidae.—VENEZUELA: cerros Duida, 1 ♂, 7 ♂⁷, 1 ♀, 3 ♀⁷, 1 (?)⁷; Guaiquinima, 24¹⁸.

A. p. jugularis.—VENEZUELA: Cerro de la Neblina, 8 ♂ (inc. type), 3 ♀, 2 ♀ juv., 6 (?), 2 juv. (?).

Zonotrichia capensis inaccessibilis, new subspecies

Type: From Cerro de la Neblina, headwaters of the Río Yatúa, Territorio Amazonas, Venezuela; 1900 meters. No. 60345, Phelps Collection, Caracas. Adult male collected January 20, 1954, by W. H. Phelps, Jr. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from all races of *Z. capensis* by darker, purer gray, less brownish, breast, sides and flanks. Nearest to *Z. c. macconnelli* Sharpe, of the summit of Mt. Roraima, from which it differs additionally by a more extensive and darker chestnut collar; the striping of back, and margins of tertials and upper wing-coverts more rufous; and longer bill. From *Z. c. roraimae* (Chapman), of Bolívar and Terr. Amazonas, differs as above and additionally by larger size and more extensively black crown.

Range: Known only from Cerro de la Neblina in the Subtropical Zone.

Description of Type: Top of head black with wide median stripe of dark gray, narrower on forehead; prominent lighter gray superciliary stripe extending from bill to neck; auricular stripes black; rest of face dusky gray, speckled with whitish under the eyes; a wide prominent collar, extending from sides of breast over the neck, Sanford's Brown; feathers of back blackish, heavily margined with brownish; uropygium more olivaceous than Mouse Gray. Throat white, the sides faintly speckled with grayish; lower throat with a wide black collar partially broken in the center; breast nearest to Light Grayish Olive; sides and flanks more brownish olive; abdomen whitish; under tail-coverts olivaceous brownish heavily margined with whitish. Remiges Benzo Brown, lightly margined externally with grayish; tertials and greater wing-coverts black, heavily margined externally with Burnt Sienna, the latter tipped with grayish; lesser wing-coverts black prominently margined with whitish; under wing-coverts and axillaries grayish white. Feathers of tail Benzo Brown on inner vanes, dusky brown on outer ones, narrowly margined with grayish except on outermost.

Bill (in life) "dark horn color"; feet "dark brown"; iris "brown." Wing, 69.5 mm.; tail, 65; exposed culmen, 13; culmen from base, 16.5; tarsus, 22.5.

Remarks: Sexes similar in color but males have longer wings and tail. Size similar to *macconnelli* but with longer bill. Range of mea-

¹⁸ For number and sex see Phelps and Phelps, Jr., Proc. Biol. Soc. Wash., 63, p. 47, April 26, 1950.

Measurements: four adult males (inc. type)—wing, 69.5-71 (70.1) mm.; tail, 62-65 (63.7); culmen from base, 16.5-17.5 (17.1); two adult females—wing, 65, 67; tail (1), 59; culmen from base (1), 16.5. Measurements of *macconnelli*: one adult male—wing, 72; tail, 64; culmen from base, 15; two males¹⁹—wing, 71, 71; tail, 65, 65; two adult females—wing, 68, 69; culmen from base, 15, 15; two females¹⁹—wing, 67, 71; tail, 61, 65. Measurements of *roraimae*, from Mt. Roraima: five adult males—wing, 65-67 (66.2); tail, 57-60 (58.6); culmen from base, 14-15 (14.5); five adult females—wing, 62-62.5 (62.1); tail, 53-56 (54); culmen from base, 13.5-15 (14.1).

Description of juvenile male. Differs from the adult by dusky brownish crown, instead of black, with center stripes ill defined and more brownish; nuchal collar narrow and ill defined, buffy brown with dusky stripes; the large black spots on sides of throat are lacking, the entire under parts being whitish with yellowish tint on abdomen, the throat with small dusky spots, the breast sides and flanks heavily striped with blackish and the abdomen almost without stripes.

The Brazilian specimen of *roraimae* from the Rio Cotinga, listed below, was collected by Pinkus²⁰ on the headwaters of that river near the base of Mt. Roraima.

The summit of Cerro Uei-tepui, approximately 2000 meters, is on the boundary between Brazil and Venezuela; the same boundary east of Santa Elena de Uairén, where other Brazilian specimens were collected, has an altitude of 1000 meters.

Specimens Examined

Z. c. costaricensis.—VENEZUELA: Táchira: 28; Mérida: 30; Trujillo: 17; Lara: 7.

Z. c. venezuelae.—VENEZUELA: Zulia: cerros Pejochaina, Perijá, 2 ♂, 2 ♀, 4 (?); Tetarí, 1 ♀. Yaracuy: 1; Aragua: 9; Distrito Federal: 18; Miranda: 1; Monagas: 11.

Z. c. roraimae.—VENEZUELA: Bolívar: Arabopó, 5 ♂, 3 ♀; Kabanayén, 5 ♂, 1 ♀, 1 (?); Santa Elena de Uairén, 1 ♂, 1 ♂ juv.; cerros Roraima, 16 ♂, 14 ♀, 1 (?); Uei-tepui, 15 ♂, 3 ♂ juv., 13 ♀, 1 (?); Cuquenán, 9 ♂, 8 ♀, 1 (?); Paurai-tepui, 4 ♂, 1 ♂ juv., 3 ♀, 3 (?); Ptari-tepui, 1 ♂, 1 ♀; Sororopán-tepui, 1 ♀; Acopán-tepui, 3 ♂, 1 ♀; Upuigma-tepui, 5 ♂, 3 (?); Uaipán-tepui, 14 ♂, 14 ♀, 1 (?), 3 juv.; Auyan-tepui, 3 ♂, 4 ♀; Guaiquinima, 5 ♂, 3 ♀, 1 (?). TERR. AMAZONAS: cerros Yaví, 1 ♀; Guanay, 19 ♂, 11 ♀, 8 (?). BRAZIL: Rio Cotinga, 1 ♂; Cerro Uei-tepui, boundary on summit, 1 ♂; boundary, east of Santa Elena de Uairén, 5 ♂, 1 ♂ juv.; Uacará, on the Rio Negro²¹, 1 ♀. BRITISH GUIANA: Arabarú River, 2 ♀, 1 (?).

Z. c. macconnelli.—VENEZUELA: Bolívar: Cerro Roraima, summit, 1 ♂, 3 ♂, 2 ♀, 2 ♀.

Z. c. inaccessibilis.—VENEZUELA: Terr. Amazonas: Cerro de la Neblina, 4 ♂ (inc. type), 1 ♂ juv., 2 ♀.

¹⁹ Specimens in American Museum of Natural History. See Chapman, Am. Mus. Nov., No. 341, p. 6, 1929.

²⁰ See Phelps, Resumen de las Colecciones Ornitológicas hechas en Venezuela. Bol. Soc. Ven. Cien. Nat., 61, Oct.-Dec., 1944, p. 397.

²¹ For remarks on this specimen collected near Santa Isabel, about 200 kilometers SE of Cerro de la Neblina, see Chapman, Post Glacial History of *Zonotrichia capensis*. Bull. Am. Mus. Nat. Hist., 77, Art. 8, p. 398, Dec., 1940.

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PROCEEDINGS
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A NEW TROPIDUCHID FROM JAPAN (HOMOPTERA:
FULGOROIDEA)

BY R. G. FENNAH

The genus *Trichoduchus* comprises three species, *pilosus* (Horn.) from South Europe, *biermani* Damm. from Java, and *china* Wu (= *biermani* Muir not Damm.) from Macao, China. Our knowledge is based on extremely few specimens—not more than half a dozen in the case of the asiatic species—but it is evident that both brachypterous and macropterous forms occur, and that macropterous forms vary in the intensity of tegminal pigmentation.

The fortunate capture of a pair of *Trichoduchus* in Japan by Dr. P. W. Oman has greatly extended the known range of the genus. His specimens, which have been deposited in the U. S. National Museum, are described below. Thanks are tendered to Dr. Oman and Dr. David Young for the privilege of examining this rare material.

Trichoduchus Bierm.

Bierman 1910 *Nat. Mus. Leyd.* 33:28. Haplotype, *T. biermani* Damm. *loc. cit.*: 29.

Trichoduchus japonicus sp. n.

(Fig. 1)

Vertex between basal angles as broad as long in middle line; clypeus with a subconical prominence near its middle. Posttibiae with two spines laterally, seven apically; basal metatarsal joint with four spines and one subspinose elevation.

Ochraceous yellow; head and thorax marked with fuscous brown as shown in figures; thoracic pleurites fuscous with edges narrowly pale stramineous, femora coarsely speckled and tibiae twice ringed with fuscous, abdomen fuscous except at lateral margins. Tegmina (brachypterous) fuscous-piceous; about fifteen cuneiform spots around margin from base of costa to apex of clavus, three or four narrow transverse bars in basal third of cell Sc + R, a narrow transverse bar and a quadrate area in basal third of discal cell M, an irregular area between Cu 1 and claval suture, and about five small areas in clavus, three of them along posterior margin, hyaline. Veins concolorous with ground. Wings absent.

Anal segment of male short, apical margin transverse, anal foramen at middle. Pygofer moderately broad, posterolateral margins shallowly convex. Aedeagus with phallus long, narrowly tubular, weakly sigmoid, surrounded in its basal sixth by a membranous collar (phallobase) from which arises on left a slender filament which lies alongside phallus to

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its apex, and a rather stouter ventral median subfilamentous process lying below phallus. Genital styles irregularly trapezoidal with ventral margin longest and dorsal margin shortest, apical margin very oblique; dorsal margin bearing a short vertical lobe near base, and distally a hook-like process, directed laterad, and a ledge-like flange on inner face arising at same level as this process.

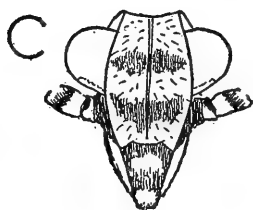
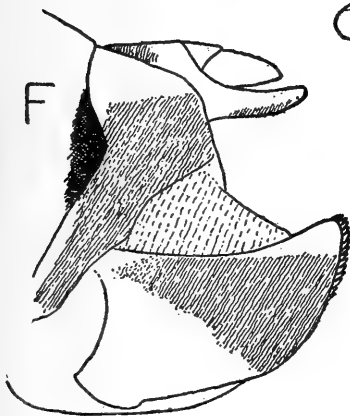
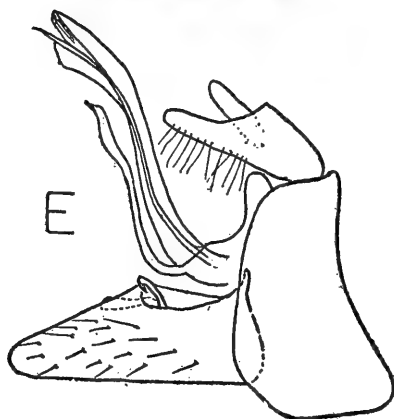
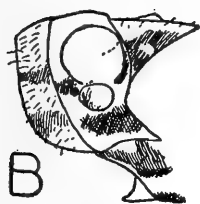
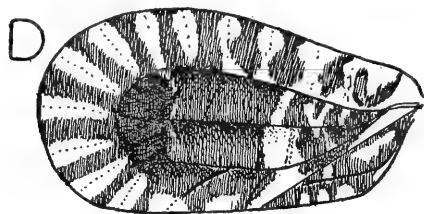
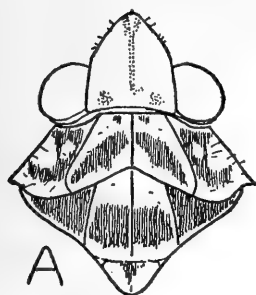
Female genitalia as figured.

Male: length, 3.1 mm.; tegmen (brachypterous), 2.8 mm. Female: length, 3.5 mm.; tegmen (brachypterous), 3.0 mm.

Holotype male of species and one female, Japan: Honshu, Kyoto, Oct. 5, 1951, Oman.

This material differs from *T. pilosus* (Horv.) in the proportions of the vertex, and from *T. biermani* Damm. and *T. china* Wu in tegminal venation and markings. It agrees to some extent with the incomplete description of *T. china* but most of the points of agreement are probably of generic value: this is almost certainly so with the female genitalia. It differs from *T. china* in the pigmentation on the frons and thorax, and in the pallid markings of the tegmina: these in *T. china* have yellow veins on a dark ground and three round yellowish spots, one in each of the first and second median cells and a third over the radius, as in *T. biermani*.

It is perhaps worth adding that although *T. biermani* and *T. china* are here accepted at their nominal value as distinct species, the differences between them have never been explicitly stated and cannot be satisfactorily inferred from the descriptions.



PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE FAMILY CLAUSIIDAE (COPEPODA,
CYCLOPOIDA)

BY MILDRED STRATTON WILSON

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and

PAUL L. ILLG

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There has crept into the literature on poecilostome Cyclopoida a misconception of the family Clausiidae. This seems in part, at least, to be traceable to the fact that in his diagnosis of this group, G. O. Sars (1918) did not sufficiently clarify its status, and some workers gained the impression that he was erecting a new family. To what extent he was aware of the discussions in the literature, it is not possible to judge. His own discussion is very brief. He mentions *Clausia* as the type of the family, refers to it his new genus *Conchocheres*, and suggests that *Myicola* Wright might also be included in the group.

Monod and Dollfus (1932) in their important and useful summary of the copepod parasites of Mollusca, considered that Sars was the author of this family. They added to it a few other genera, and stated that it is evidently closely allied to the Ergasilidae. In a later paper of this series (1934) they pointed out that the family was poorly defined and perhaps not a natural group, because one of the characters accepted as fundamental by them and Sars, that is, the absence of the maxilliped in the female, might be a generic character. C. B. Wilson (1932) had referred *Myicola* to the Lichomolgidae, and influenced by this, Monod and Dollfus suggested that the Clausiidae might in time be absorbed by the Lichomolgidae.

Yamaguti (1936) created, without diagnosis, a family Myicolidae, in which he placed *Myicola* and *Pseudomyicola*, a new genus. To the Clausiidae he referred, without comment, several other Japanese genera and species commensal in Mollusca.

There has thus grown up a concept of the family Clausiidae based upon the premises that Sars is its author, that it is comprised of mollusk parasites or commensals, that the female lacks the maxilliped, and that it is closely allied to the Ergasilidae and Lichomolgidae. The facts, however, are quite different. It is necessary only to trace the references to the type genus, *Clausia*, through the literature, to find that the fam-

ily was instituted by Giesbrecht, that it is composed of copepods mostly associated with annelids, that the maxilliped is present in the female, and that the opinion is held that the group is most closely allied to the Clausiidae.

Clausia lubbockii was described by Claparède in 1863 from specimens collected in a plankton tow. Giesbrecht (1893) redescribed the species from a specimen found in a vial containing marine annelids that occurred on oyster shells. Since the characters of the copepod exhibit the modifications and reductions characteristic of annelid commensals, he was probably correct in assuming that the association with the worms was not incidental. Giesbrecht's description and illustrations are most excellent, providing the details of all the significant appendages. He refers to those of the oral area as mandible, the first maxilla, the second maxilla, and the maxilliped. This latter appendage is of a reduced nature, unsegmented, insignificant in size and armed apically only with hairs.

In the description of a new genus *Seridium*, Giesbrecht (1895) pointed out that it was closely allied to *Clausia* and to *Rhodinicola* Levinsen (1878), and stated that (p. 226) "diese drei Anneliden Parasiten zu einer engeren systematischen Gruppe (Familie Clausiidae) zusammenzufassen waren." The family is thus attributable to Giesbrecht (1895) not to Sars (1918).

Only two authors have referred directly to Giesbrecht's work—Gravier (1912 and C. B. Wilson (1923). Gravier (p. 67) discussed Giesbrecht's interpretation of the family and added to it his genus *Bactropus*. Wilson referred to the works of Giesbrecht and Gravier and added to their lists a new genus *Pherma* which had been collected from the parapodia of an unnamed annelid.

Chronologically, Sars' diagnosis of the Clausiidae follows Gravier's paper. Throughout his monumental work on the crustacea of Norway, he did not trace the synonymy of families, and it is not always easy to tell even if the family is newly created. In the case of the Clausiidae at least this has been unfortunate. Sars' diagnosis is very broad and in many ways indefinite, as seen particularly in his meaningless description of the mouth parts: "Oral parts more or less imperfectly developed; the posterior maxillipeds being in female rudimentary or quite absent." By "rudimentary" he undoubtedly referred only to those of *Clausia*, by "absent" to the condition in his new genus *Conchocheres*. His description of the posterior antenna as being "distinctly prehensile" is somewhat questionable in the case of *Clausia*. The combined armature of several weak, somewhat modified claws and long setae seems to make the term "subprehensile" more appropriate.

None of these authors referred to the genus *Mesnilia* Canu (1898). Canu did not assign *Mesnilia* to the Clausiidae, but did point out its undoubted resemblance to *Clausia*. It rather appears that he may not have been aware that Giesbrecht had established this family two years before. His suggestion (p. 402) that *Clausia cluthae* T. and A. Scott (1896) should be included in *Mesnilia* rather than in *Clausia* has some merit, although as he emphasized, the knowledge of the oral appendages of this species is imperfect (see below, p. —).

Mesnil and Caullery (1916) further pointed out the similarity of

Mesnilia martinensis to *Clausia lubbockii*. They followed Canu in not referring to the family Clausiidae, or to Giesbrecht's paper on the genus *Seridium*. Their work is of importance in establishing as host of *Mesnilia martinensis*, the annelid, *Polydora flava*.

The references reviewed above constitute the only discussions of the family Clausiidae of which we have knowledge in the literature. It seems desirable that consideration should be given here to the diagnostic characters of the family so far as they can be ascertained, and to the genera that have been, correctly or incorrectly, assigned to the family.

Diagnostic Characters of the Clausiidae

Giesbrecht did not give a formal diagnosis of the family that he had proposed, but in comparing the females of the three genera he drew together in this group, he mentioned the characters he considered basic in showing their relationship. These, which may be taken as outlining the original concept of the family, are:

Structure of the body.

Similarity of the posterior antennae and mouth parts.

Reduction of the thoracic legs in varying degrees.

Association with the Annelida.

In presenting here a diagnosis of the family we do so with certain reservations. The genera are restricted to those which are most adequately described, and the characters include those considered basic by Giesbrecht, except for the structure of the body. The genera of which Giesbrecht had knowledge possessed a similar elongate body, but since it is likely that these similarities could be due to convergence as well as to phylogeny, this cannot be considered a family character. Indeed, it is questionable, at least among the poecilostome Cyclopoida, whether body form is ever more than a specific character. Further, the desirability of reexamination of all the genera and species concerned, is recognized. A truly comprehensive diagnosis can be presented only upon the actual and accurate comparison of specimens of the species involved. In the meantime, the following diagnosis gives a summary of characters upon which pertinent discussion can be based.

Family CLAUDIIDAE Giesbrecht 1895

Diagnosis (emended).—Antennules short, 4-6 segmented. Antenna 3- or 4-segmented, the two terminal segments armed with setae and sub-prehensile claws of varying number and size; the terminal segment showing a definite tendency to reduction and in some cases to an offset lateral position. Mandible reduced in size, with a posteriorly directed terminal claw or modified "cutting" portion, with or without other accessory pieces or setae. The first maxilla stouter or more reduced than the mandible, a simple, elongate lobe bearing setae placed in one or two groups; its basal attachment more laterally situated than that of the mandible from which it is clearly distinct. The second maxilla and the maxilliped varying among the genera. Second maxilla bimerous, the basal segment tending to great expansion, terminal segment a stout claw or a modified claw. Maxilliped present in the female, of a single unmodified segment armed apically with hairs or spinules (*Clausia*) or a simple claw (*Teredicola*) or of 3 or 4 well-defined segments with an

apical (*Rhodinicola* ?) or subapical claw and terminal knob (*Seridium*) or a platelike development of the apex (*Mesnilia*). The maxilliped in the only known male (*Teredicola*) with a long terminal claw.

Legs 1-4 showing various degrees of reduction, both in size of the appendage and segmentation of the rami, some pairs may be completely absent; leg 5 varying in size and segmentation, not always present (see Table I).

Known genera associated with Annelida and Mollusca (*Teredinidae*).

Family type.—*Clausia* Claparède.

Included genera.—*Clausia*, *Seridium*, *Mesnilia*, *Teredicola*.

Inadequately known: *Rhodinicola*.

Discussion of the Genera

There is no question about the inclusion of *Clausia* and *Seridium* in the Clausiidae since Giesbrecht built the original family concept on his knowledge of these genera. Canu pointed out the undoubted resemblance of *Mesnilia* to *Clausia* and it is included here without qualification because it exhibits the important family characters of the antenna, the mandible and the legs. Such differences as exist may be found upon further investigation to be specific rather than generic in nature. The most striking difference is the structure of the female maxilliped, an appendage exhibiting considerable variability throughout this group of genera. Since it is the character that has been most misinterpreted, it is well to stress that this appendage is rudimentary only in *Clausia lubbockii*.

The inclusion of *Teredicola* C. B. Wilson needs some qualification and furthermore is dependent upon the correction of some errors in the description of the type and only known species, *Teredicola typica*. C. B. Wilson (1942, 1944) has wrongly interpreted the segmentation of the body in the female, showing the ovisacs as attached to the segment posterior to the actual genital somite. This error has been corrected in an illustration, without comment, by Edmondson (1945, fig. 1) who shows not only the correct position but the distinctive membranous process by which the ovisacs are attached to the genital opening. Giesbrecht has noted a similar process in *Seridium*. The antennule is 5-, not 6-segmented. The mandible and first maxilla were not mentioned by Wilson, and though he has accurately described the second maxilla and maxilliped, the drawing of one of these (probably the maxilliped) has been mislabeled "second antenna" (C. B. Wilson, 1942, fig. 1c). Actually, he neglected to figure the antenna which is closely similar to that of the other well defined genera of the Clausiidae. A single claw is borne on an extended portion of the penultimate segment and a group of stiff setae on the small laterally offset apical segment. The mandible has in addition to a broad terminal serrate blade, two dorsally placed accessory pieces, one a stout seta, the other a somewhat flattened foliate structure. The maxilliped of the male is different from that of the female, having two well developed basal segments and an elongate apical claw. Both sexes have two pairs of extremely small legs with 2-segmented rami (Table I).

Teredicola typica differs from the other Clausiidae in having the forepart of the body of the female exceedingly swollen. This does not

exclude it from the group since, as pointed out above, body form is not a family character. The second antenna with its combined armature of setae and single claw; the shortened mandible with its backwardly directed terminal piece; the elongate but simple first maxilla, inserted far laterally to the base of the mandible; and the reduction of the legs are all unmistakable clausiid characters. The armature of the mandible is more complex than the simpler structure shown for *Clausia lubbockii* by Giesbrecht or for *Mesnilia martinensis* by Canu. In this respect alone, *Teredicola* appears more closely allied to the Clausidiidae.

Since the copepod commensals of the Annelida have been little investigated, it is hardly surprising that *Rhodinicola elongata* Levinsen (1878) has not been redescribed. We have followed Giesbrecht in including *Rhodinicola* in the list of clausiid genera, but with reservations. It is not absolutely certain that the species would be recognizable from Levinsen's description. Nor can it with any more certainty be included in the family because the details of the second antenna and mandible are lacking, and the first maxilla has been entirely omitted in the illustrations. The mandible is shown as an unsegmented, posteriorly directed blade. The second maxilla is of simple structure with a stout apical claw, as in *Teredicola*; the maxilliped is composed of four slender segments. The legs are extremely reduced in size, but are described as having the rami completely segmented, differing in this respect from the other genera (see Table I).

Giesbrecht suggested that *Donusa* Nordmann (1864) might be synonymous with *Rhodinicola*. Such an opinion is hardly acceptable in view of the inadequate knowledge of both genera, and some probable inaccuracies in Nordmann's description. According to Nordmann, legs 1-4 are biramose with trimerous rami, which would agree with *Rhodinicola*. His further statement that leg 5 is biramose with 3-segmented rami was considered questionable by Giesbrecht (1895, p. 225). Certainly all the information accumulated since Nordmann, justifies Giesbrecht's objection because no copepod except in the Calanoida has ever been found with biramous fifth legs. It is difficult to understand why C. B. Wilson in his study of the Dichelesthiidae (1922) should have characterized Nordmann's description and figures as "clear-cut and decisive" and should have accepted this obviously fantastic condition. In placing the genus in the Dichelesthiidae, he undoubtedly followed Nordmann who had referred *Donusa* to this group. Nordmann emphasized that the second antenna of *Donusa* was not developed into a "Klammerapparat" as in *Lamproglena* (Dichelesthiidae), a point which makes it seem likely that relationship to the highly modified dichelesthiid group is not tenable. It must be concluded that neither the systematic position of *Donusa* nor the identity of its type species can be resolved until the form is again collected and identified with certainty.

In comparing the known annelid parasites having elongate bodies, Giesbrecht also referred to the genus *Sabellacheres* M. Sars (1861). He pointed out that List (1890) had suggested that this genus is very close to or congeneric with *Gastrodelphys*. The only knowledge of *Sabellacheres* is from the original brief Latin diagnosis which though obscurely formulated seems to bear out the opinion of List. Certainly there is no evidence for its inclusion in the Clausiidae, and it is not

TABLE I.
Number of Segments in Legs of the Clausiidae

	Leg 1		Leg 2		Leg 3		Leg 4		Leg 5	
	exo	endo	exo	endo	exo	endo	exo	endo		
<i>Clausia lubbockii</i>	3	2	3	2	1	0			2	
<i>Clausia chuthae</i>	3	2	3	2	3	1	3	1	2	
<i>Seridium rugosum</i>	2	1	2	1	2	1	2	1	reduced to knob and seta	
<i>Rhodinicola elongata</i>	3	3	3	3	3	3	3	3	2	
<i>Mesnilia martinensis</i>	3	3	3	3	3	0	3	0	2	
<i>Teredicola typica</i>	2	2	2	2	leg lacking		leg lacking		leg lacking	

believed that Giesbrecht intended so to infer.

The inclusion in the Clausiidae of *Bactropus* Gravier, *Pherma* C. B. Wilson, and *Conchocheres* G. O. Sars, would require modification of the restricted definition given above. These genera are regarded by us as possible members of the group, but their inclusion requires further description or clarification of pertinent appendages. The reduction of the urosome in *Bactropus* and *Pherma* hardly appears a valid reason for excluding them from the family, and it is not so construed. *Bactropus cystopomati* should be readily recognizable from Gravier's description. But since it does have some unusual features, it would be well to know in more detail the exact structure of the oral appendages, particularly the mandible, before its familial position is determined. The same applies to *Pherma*, which indeed, it would be impossible to assign to any family, since C. B. Wilson omitted a description of the oral appendages. Here it should be noted that a genus proposed later by Wilson (*Pestifer*, 1944) has a superficial resemblance to *Pherma* in body form and the structure of the antennule (first antenna) and the possible congeneracy of the two should be investigated. Wilson referred *Pestifer* to the Clausidiidae, but here again evidence of familial position is lacking because the oral appendages were not described.

Similar reasons apply to *Conchocheres*. The lateral extensions of the cephalic somite, the unreduced condition of legs 1-4, the absence of the maxilliped in the female, and its association with a mollusk rather than an annelid, are not necessarily great enough differences to exclude the genus. There is, however, a basic concept in Sars's interpretation of the relationship of the first two pairs of oral appendages that is in contradiction to the facts of structure observed by us and other authors who have examined the recognized genera of this family. He has subscribed throughout his work to the premise that in the *Poecilostoma* the lobelike structure called first maxilla by many other authors is only the palp of the first maxilla, and in his illustrations he has always shown this structure attached to the appendage considered by others as the mandible. In all other illustrations in the literature reviewed here, and in *Teredicola* which we have examined, these two structures are clearly distinct from one another. The form of the first maxilla in *Teredicola* is elongate and it arises laterally far beyond the discernible base of the mandible.

In *Conchocheres*, the mandible (first maxilla of Sars) as pictured *in situ*, is directed posteriorly; the enlarged view shows it to be unsegmented, produced apically to a minute claw and armed with very small accessory spines. Such structures is not ergasilid or lichomolgid in nature, and it is recognized that this apparent simplicity might be interpreted as an example of reduction from the somewhat more developed armature of the clausiid type. Such might also be true of the structure of the second antenna, whose terminal armature consists of a single, short, but very stout claw. The latter is, however, a noticeable departure from the basic clausiid antennal structure, which in combination with the characters of the mandible and the lack of reduction in legs 1-4, may indicate that *Conchocheres* belongs to a different systematic group. It would therefore be well that inclusion in or consequent modification of the family be reserved until reexamination of the

genus determines the actual relationship of the oral appendages. Even with exact knowledge, it will probably be necessary to await discovery and adequate elucidation of other related genera before a proper evaluation of these characters can be made.

Of the genera that have been erroneously ascribed to the Clausiidae, either directly or by inference, the following dispositions may be made.

Myicola R. R. Wright, referred to this family by Sars (1918) and Monod and Dollfus (1932), was placed in the Lichomolgidae by Pelseneer (1928) and C. B. Wilson (1932) and, by inference, in a family Myicolidae, erected without diagnosis, by Yamaguti (1936). The systematic position of *Myicola* is without doubt that ascribed to it by its author, who stated quite clearly (Wright, 1885, p. 120): "it occupies a position intermediate between *Lichomolgus* and *Ergasilus*."

A species described by Williams (1907) as *Lichomolgus major* and erroneously referred to *Myicola* by C. B. Wilson (1932) was placed in the Clausiidae by Monod and Dollfus (1934, p. 316). This species has been made the type of a new genus, *Myocheres* M. S. Wilson (1950). It is undoubtedly allied to the Clausiidae rather than to the Ergasilidae or Lichomolgidae. It has not here been placed in the Clausiidae because of the lack of reduction in the legs and the difference in the apical pieces of the mandible, which exhibit unique modifications. That it may form with other as yet unknown forms, a subdivision of the Clausidiidae, or a separate allied family, is possible. On the other hand, when more knowledge is available, the Clausiidae may come to be interpreted or modified in such a way as to include it.

Monod and Dollfus (1932) included *Mytilicola* Steuer and *Trochicola* Dollfus. We hesitate to suggest any disposition of these highly modified forms, but certainly they do not appear from present knowledge to be referable to the Clausiidae. The absence of the mandible and the maxilliped in the adult may well be only generic characters, but the large prehensile second antenna removes them from possible consideration as members of the Clausiidae. Hockley (1951) has described the mandible of *Mytilicola intestinalis* in an early copepodid stage. The simplicity of its structure gives no indication of relationship to other genera. In a recent paper, Humes (1954) has presented a good summary of the taxonomic studies on *Mytilicola* and has both illustrated and tabulated the specific differentiation within the genus. He raises the question of the seemingly possible congeneracy of *Mytilicola* and *Trochicola*.

The inclusion of *Lecanurius* Kossmann (1877) as suggested by Monod and Dollfus (1932) cannot be justified on the basis of its description. The genera proposed by Pelseneer (1928), also suggested for inclusion by Monod and Dollfus (1932, footnote, p. 154), are inadequately described, the oral appendages and second antennae entirely unknown; their identity is establishable only from types or topotypes. This has been recently ably done for *Tococheres cylindraceus* by Stock (1954) who has placed the genus correctly in the clausidiidae. Stock further mentions that Pelseneer's types do not appear to be in existence. *Panaetis* Stebbing, originally considered by Monod and Dollfus as a clausiid, was more correctly assigned by them (1934) to the Lichomolgidae. Such a disposition is also more accurate for the genera *Philoconcha* and *Paraphiloconcha* placed in the Clausiidae by their author, Yamaguti (1936).

Both of these have a characteristic lichomolgid type mandible.

T. Scott (1902) proposed a new genus and species, *Pseudopsyllus elongatus*, which he compared to *Clausia*. It is evident from the structure of the maxilliped that the specimen described by Scott was a male, and not a female as he had supposed. This was the only oral appendage described so that the actual identity of Scott's specimen is not determinable, nor can it be judged if it represents a valid genus. The structure of the second antenna is of the clausiid or clausidiid type. The legs are too well developed to admit the form to the Clausiidae in the present restricted definition.

Systematic Position of the Clausiidae

The supposed relationship of the Clausiidae to the Ergasilidae and Lichomolgidae has been based upon the erroneous interpretation that has recently been given to this family, and is not tenable. On the other hand, the recognition by Giesbrecht and Canu of structural similarities between the Clausiidae and the Clausidiidae has a basis in fact as well as considerable merit. These two authors have presented the most complete and seemingly accurate studies of the genera assignable to the Clausiidae. They have also studied quite thoroughly several examples of the family Clausidiidae. Canu has, in fact, presented in his paper establishing this family (Canu, 1888) not only a most complete and exacting study of his examples, but one of the most admirable and useful papers ever published in the field of the Copepoda.

Giesbrecht (1893) in his redescription of *Clausia lubbockii* stated that *Clausia*, like *Hersiliodes*, shows relationship through the structure of both pairs of antennae, the maxilla and the mandible, to the Oncaeidae. Canu also commented on this. In his paper on *Mesnilia* (Canu, 1898) he recorded the genus thus: "Fam. incerta (Hersiliidae pars?)" and in discussion stated that "*Mesnilia* and *Clausia* approach in many points the Hersiliidae¹ and the Oncaeidae." It appears to us that the Oncaeidae present a rather confused complex of characters, some of which are primitive for the Poecilostoma, others highly derived planktonic modifications, so that it would seem impossible to arrive at such a far reaching conclusion as these earlier workers did. The differences between the Clausiidae and Clausidiidae, however, are of a less encompassing nature, and there is doubtless a valid and close relationship between them. Indeed, further study may reveal intermediate conditions such as seem to exist in the mandible of *Teredicola*, so that copepod systematics may best be served by merging the two families or by establishing an inclusive higher category.

The Clausiidae exhibit more evidences of reduction than is found in the commonly known genera of the Clausidiidae (*Clausidium*, *Hemicyclops*, *Hersiliodes*). In spite of this, there are strong resemblances, particularly in the second antenna with its tendency to reduction and offset position of the ultimate segment, and in the armature of the mandible. It may be of systematic importance that in these two groups, the terminal portion of the mandible blade is more or less expanded and always strongly directed posteriorly. The modified apical pieces, some of which are always stout setae when more than one is present, do not all arise in exactly the same plane, but are instead attached to separate

¹The Hersiliidae is the present day Clausidiidae, renamed by Embleton (1901).

lobes or arranged in an irregular series around the more or less thickened apex of the blade. This forms a striking contrast to the anteriorly directed, flattened blade of the well known *Ergasilus*, of *Myicola*, and of the genera of the Lichomolgidae.

Paragnaths, which are lacking in the Ergasilidae and Lichomolgidae, are present in the Clausidiidae. They have not been reported in the literature on the Clausiidae, but in two instances, their presence is suggested. In the illustration of the oral area of *Mesnilia* (Canu, 1898, pl. 8), the first maxilla is depicted as having an accessory lobe. Canu has described the appendage thus: "Les maxilles se composent d'une partie basilaire armée de deux soies courtes vers l'intérieur et prolongée par un lobe distal saillant au-dessus de la base des mandibules et accompagné de trois soies en partie barbelées." The illustration does not present any evidence that the three setae are part of the projecting lobe, and the question arises as to whether it is actually a part of the maxilla. Since Canu has so adequately recognized paragnaths in the Clausidiidae, one would expect him to interpret them correctly if they are present in *Mesnilia*. As this structure is so peculiar, however, it would be well that *Mesnilia martinensis* be reexamined for a more complete delineation of the first maxilla and the possible presence of paragnaths. Such study might be most instructive if direct comparison could be made with specimens of *Clausia lubbockii* which also has a comparatively large first maxilla.

Canu (1898, p. 402) in suggesting that *Clausia cluthae* T and A. Scott (1896) might be referable to *Mesnilia*, pointed out that knowledge of the buccal appendages is imperfect. Examination of the illustrations of this species certainly bears this out, and we suggest that either the captions have been transposed, or that the appendages have been confused with one another in dissection. The magnification given for figure 7 (X 760) is much greater than that for the other figures so the appendage must be smaller. From both this lesser size and its structure it seems likely that this figure represents the mandible, although it is labeled "anterior foot jaw" (second maxilla). Figure 5 is labeled mandible, but both structure and comparative size suggest that the lobe bearing the three setae is the first maxilla or a portion of it. The hairy lobe partially overlying the setiform structure may well represent a paragnath. Figure 6, labeled "maxilla" may be a modified terminal portion of the second maxilla or of the maxilliped, similar to that depicted for *Mesnilia martinensis*. When this species is reexamined the possibility of such confusion should be borne in mind.

Structures interpretable as paragnaths have been found in *Teredicola*. These are simple, unornamented, lobed swellings jutting up from the ventral surface posterior to the mandible and filling the space just distad to the inner portion of the maxilla. Sinuous, ornamented paragnaths are present in a similar position in *Myocheres major*.

The Need for Further Study

In the discussions of the genera concerned in this review, it has been necessary to qualify the interpretation of, or suggest the need of further investigation of many structures and genera. It should be well recognized by all workers in the Pöciclostoma that with such incomplete

knowledge, it is impossible to delimit many of the genera in family groups. This appears to be the result of two circumstances:

1. The inadequacy of collections, suggesting that many forms are yet unknown.
2. The inadequacy of description, particularly of the details of the seemingly fundamental characters found in the cephalic appendages and the impinging structures of the buccal area.

It is important, therefore, that the student of these copepods direct himself to careful and systematic collecting, and to precise, detailed study of the specimens. The proposal or acceptance of genera or species based only upon body shape, or upon appendages such as the antennule, the posterior oral appendages, and thoracic appendages, which appear to have a limited systematic importance, will always lead to confusion. We do not feel that we are being too exacting to suggest that no species or genus should be proposed without thorough delineation of all the appendages. Particular attention should be given to the exact details of the antenna and the mandible. The buccal region should be studied both *in situ* and in dissection, for the relationships of the appendages and the character of the surrounding structures, such as the labrum, labium, paragnaths and postoral protuberances are also of systematic importance. It is only through such description that we will gradually come to know these puzzling copepods well enough to derive the critical concepts necessary to delimit and establish higher categories.

LITERATURE CITED

- Canu, Eugène. 1888. Les copépodes marins du Boulonnais III. Les Hersiliidae, famille nouvelles de copépodes commensaux. Bull. Sci., France, Belgique. 19: 402-432, pls. 28-30.
- . 1898. Note sur les copépodes et les ostracodes marins des côtes de Normandie. Bull. Soc. Amis Sci. Nat. Rouen. 33: 389-422, pls. 3-10.
- Claparède, Edouard. 1863. Beobachtungen über Anatomie und Entwicklungsgeschichte wirbelloser Thiere an der Küste von Normandie angestellt. Leipzig. 120 pp. 18 pls.
- Edmondson, Charles Howard. 1945. Natural enemies of shipworms in Hawaii. Trans. Amer. Micros. Soc. 64: 220-224, 1 pl.
- Embleton, Alice L. 1901. *Goidelia japonica*, a new entozoic copepod from Japan, associated with an infusorian (*Trichodina*). Jour. Linnean Soc. Zool. 28: 211-229, pls. 21-22.
- Giesbrecht, W. 1893. Mittheilungen über Copepoden. 1-6. Mitt. Zool. Sta. Neapel. 11: 56-106, pls. 5-7.
- . 1895. Mittheilungen über Copepoden. 11. Ueber *Seridium rugosum*, einen neuen Anneliden-Parasiten. Mitt. Zool. Sta. Neapel. 12: 223-226, pl. 9, figs. 14-21.
- Gravier, Ch. 1912. Crustacés parasites. Deuxième Expédition Antartique Française (1908-1910) commandée par le Dr. Jean Charcot. pp. 27-77, Figs. A-B, and 1-60.
- Hockley, A. R. 1951. On the biology of *Mytilicola intestinalis* Steuer. Jour. Marine Biol. Assoc. 30(2): 223-232, figs. 1-3.
- Humes, Arthur G. 1954. *Mytilicola povrecta* n. sp. (Copepoda: Cyclopoida) from the intestine of marine pelecypods. Jour. Parasitology. 40: 186-194, pls. 1-3.

- Kossmann, Robby. 1877. Zoologische Ergebnisse einer im Auftrage der Königlichen Academie der Wissenschaften zu Berlin ausgeführten Reise in die Küstengebiete des Rothen Meeres. Erste Hälfte. IV. Entomostraca (1 Theil: Lichomolgidae). 24 pp. 6 pls. Leipzig.
- Levinsen, G. M. R. 1878. Om nogle parasitiske Krebsdyr, der snylte hos Annelider. Viden. Medd. naturhist. Forening Kjobenhavn, 1877, pp. 351-380, pl. 6.
- List, Joseph Heinrich. 1890. Das Genus *Gastrodelphys*. Zeit. Wiss. Zool. 49: 71-146, pls. 4-7.
- Mesnil, F. and M. Caullery. 1916. Notes biologiques sur les mares a Lithothamnion de la Hague. II. Sur l'habitat d'un copépode semi-parasite, *Mesnilia martinensis* Canu 1898. Bull. Soc. Zool. France for 1915. 40: 176-178, figs. 1-3.
- Monod, Théodore and Robert—Ph. Dollfus. 1932. Les copépodes parasites de mollusques. Ann. Parasit. Hum. et Comp. 10 (2): 129-204, 30 figs.
- 1934. Des copépodes parasites de mollusques (Deuxième Supplément). Ann. Parasit. Hum. et Comp. 12(4): 309-321, 12 figs.
- Nordmann, Alexander v. 1864. Neue Beiträge zur Kenntniss Parasitischer Copepoden. Bull. Soc. Impér. Naturalistes Moscou. 37(4): 461-520, pls. 5-8.
- Pelseneer, Paul. 1928. Copépodes parasites de mollusques. Ann. Soc. Royale Belgique. 59: 33-49, figs. 1-5.
- Sars, Georg Ossian. 1913-1918. An Account of the Crustacea of Norway. Vol. 6. Copepoda Cyclopoida. 225 pp., pls. 1-118. Bergen Museum.
- Sars, Michael. 1861. Beretning om et nyt lernaalignende Krebsdyr, *Sabellacheres gracilis*, Sars. Vidensk. Selsk., Forhandl. i Christiania. pp. 141-143.
- Scott, T. 1902. Notes on gatherings of Crustacea collected by the fishery steamer "Garland," and the steam Trawlers "Star of Peace" and "Star of Hope," of Aberdeen, during the year 1901. 20th Ann. Rept. Fish. Board Scotland for 1901, pp. 447-485, pls. 22-25.
- Scott, T. and A. 1896. On some new and rare British Crustacea. Ann. Mag. Nat. Hist., ser. 6. 18: 1-8, plates 1-2.
- Stock, J. H. 1954. Re-description de *Tococheres cylindraceus* Pelseneer, 1929, Copépode commensal de *Loripes lacteus*. Beaufortia. 4: 73-80, 23 figs.
- Williams, Leonard W. 1907. A list of the Rhode Island Copepoda, Phyllopoda, and Ostracoda with new species of Copepoda. 37th Ann. Rep. Comm. Inland Fisheries Rhode Island. Special Paper no. 30: 69-79, pls. 1-3.
- Wilson, Charles Branch. 1922. North American parasitic copepods belonging to the family Dichelesthidae. Proc. U. S. Nat. Mus. 60(5): 1-100, pls. 1-13.
- 1923. A new genus and species of parasitic copepod from Lower California. Amer. Mus. Novit. no. 81, pp. 1-4, figs. 1-9.
- 1932. The copepods of the Woods Hole region, Massachusetts. U. S. Nat. Mus. Bull. 158, 635 pp., 316 figs., 41 pls.

-
1942. Description of a new genus and species of copepod parasitic in a shipworm. Jour. Washington Acad. Sci. 32(2): 60-62, 1 fig.
-
1944. Parasitic copepods in the United States National Museum. Proc. U. S. Nat. Mus. 94: 529-582, pls. 20-34.
- Wilson, Mildred Stratton. 1950. A new genus proposed for *Lichomolgus major* Williams (Copepoda, Cyclopoida). Jour. Washington Acad. Sci. 40(9): 298-299.
- Wright, R. Ramsay. 1885. On a parasitic copepod of the clam. Amer. Naturalist. 19: 118-124, pl. 3.
- Yamaguti, Satyu. 1936. Parasitic copepods from mollusks of Japan, I. Japanese Jour. Zool. 7(1): 113-127, pls. 7-13.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A REMARKABLE NEW SPECIES OF *PERILITUS*
FROM MEXICO (HYMENOPTERA: BRACONIDAE)

BY C. F. W. MUESEBECK
United States National Museum

For many years the collections of the National Museum have contained three male specimens of a strikingly distinct and undescribed species of the euphorine genus *Perilitus* Nees. These had been taken in 1908 at Cordoba, Vera Cruz, Mexico. Recently a female specimen of the same species, from nearby Orizaba in Vera Cruz, was received from N. L. H. Krauss. This specimen had been reared in October 1954 from a cocoon found in a burrow in the stem of *Lantana camara*. The genus *Perilitus* is best known from the common *P. coccinellae* (Schrank), a parasite of adult Coccinellidae that occurs in all the major zoo-geographical regions of the world. Other species, for which the host associations are known, likewise parasitize adults of Coleoptera, and presumably the host of the species described here is also a beetle.

Perilitus eximius, new species

This species is at once distinguished from all described species of *Perilitus* by its long, very slender and smooth abdominal petiole.

Female.—Length about 4.5 mm. Head not so strongly transverse as is usual in this genus; temple sloping gradually from eye; eye enormous, the malar space being virtually eliminated; face longer between antennae and clypeus than wide, smooth and shining; antennae considerably shorter than the body, 22-segmented in the type. Mesoscutum with notaulices sharply impressed and foveolate, and with a low but distinct and complete median keel; middle lobe of mesoscutum shallowly punctate anteriorly, coarsely punctato-rugulose posteriorly, and thinly but uniformly hairy; lateral lobes smooth and polished and largely hairless; disc of scutellum smooth and shining; propodeum completely strongly rugose, its dorsal face horizontal and fully as long as the posterior face which is vertical and broadly hollowed out medially; mesopleurum smooth and polished but with a broad, shallow, rugose, longitudinal impression below; metapleurum coarsely rugose; radial cell on wing margin distinctly longer than the stigma; recurrent vein interstitial with intercubitus; hind wing with nervellus straight and distinctly shorter than basal abscissa of basella; hind coxae smooth and polished. First abdominal segment strikingly slender, broadening a little

posteriorly but about five times as long as its apical width, entirely smooth and polished, its spiracles situated at the middle and very prominent; ovipositor sheath longer than hind tibia.

Piceous black; antennae brown; wings subhyaline; anterior and middle legs brownish yellow, their coxae and trochanters a little paler; hind legs with coxae and femora piceous, trochanters, tibiae and tarsi brownish.

Male.—Essentially like the female but with the eyes not quite so large, the wings clear hyaline and the antennae 24-segmented and about as long as the body.

Type-locality.—Orizaba, Vera Cruz, Mexico.

Type.—U. S. National Museum No.

Described from one female (type) and three male specimens, the males collected April 21, 1908 by A. Fenyes at Cordoba, Vera Cruz.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW RACES OF BIRDS FROM EAST ASIA

BY H. G. DEIGNAN*

Study of the bird collections made by the author in Thailand during 1952 and 1953, under a Fellowship of the John Simon Guggenheim Memorial Foundation, has led to the recognition of the following unnamed forms:

I.

The common dove of the Red Basin of Szechwan proves to be a well-marked race, separable from its relative of the maritime provinces of China by its saturate reddish coloration, similar to that that appears in so many birds of the same area. It may be called

Streptopelia chinensis setzeri, subsp. nov.

Type: U. S. Nat. Mus. No. 275893, adult female?, collected at Ipin [Suiful], Szechwan Province, China, on January 15, 1923, by David C. Graham.

Diagnosis: From *Str. ch. chinensis* of southeastern China separable by having the entire under parts Russet-Vinaceous (Ridgway) instead of Light Russet-Vinaceous (Ridgway), and the upper parts a deeper, slightly more rufescent, brown; from *Str. ch. vacillans* ("forresti") of southern Yunnan, and all other races except the nominate one, immediately separable by the complete absence of dark central streaks from the upper wing coverts.

Range: Lowland Szechwan and probably the adjacent areas of Kweichow; specimens from Shensi (south of the Tsinling Mountains) are intermediate between *setzeri* and *chinensis*.

Remarks: Thirteen specimens of *setzeri* have been compared with 30 of the nominate form. The new race is named for Henry W. Setzer, Division of Mammals, U. S. National Museum, who assisted me by examination of specimens of *Streptopelia* in the British Museum.

II.

The known range of *Centropus toulou* [*C. bengalensis* of authors] in the Indo-Chinese Peninsula is anomalous. Whereas in the French sphere and in Burma the species is thought to be generally distributed, in Thailand are found three populations apparently isolated from each other: the first, an uncommon winter visitor to the northern highlands and (at that season) always seen in eclipse plumage; the second, resident and common in the central plain, with adults always wearing nup-

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tial plumage in summer, eclipse plumage in winter; the third, resident and common in the Malay Peninsula from ca. lat. 8° N. southward, and possibly never reverting to an eclipse plumage when once adult. The peninsular form has long been recognized as inseparable from *C. t. javanensis* (Dumont); the northern visitant can only be *C. t. bengalensis* (of which *lignator* of southeastern China seems to be a synonym); the bird of the central plain has by some authors been called *javanensis*, by others *bengalensis*. Until recently pertinent material has been too scarce to permit of definitive identification, but through my own collecting and that of Robert E. Elbel a fine series of adults in nuptial dress is now available.

These show that the bird of central Thailand is in fact an unnamed race linking *bengalensis* with *javanensis*, and more distinct than any one of several of the accepted subspecies (which in some cases are founded upon no characters but those of size). I shall call it

***Centropus toulou chamnongi*, subsp. nov.**

Type: U. S. Nat. Mus. No. 450015, adult female (in nuptial plumage), collected at Ban Khlung Khlung [lat. 16°10' N., long. 99°45' E.], Kamphaeng Phet Province, Thailand, on April 16, 1953, by H. G. Deignan (original number 1560).

Diagnosis: From *C. t. bengalensis* separable by having the chestnut-rufous of the upper parts darker and duller, the scapularies distinctly nigrescent; from *C. t. javanensis*, by having the chestnut-rufous lighter and brighter, less nigrescent, and the hood highly glossed with steel blue and sharply demarcated from the remaining upper parts (as in *bengalensis*).

Range: Central Thailand and (apparently) southern Annam and Cochinchina.

Remarks: I agree with Grant and Mackworth-Praed (Bull. Brit. Orn. Club, vol. 59, 1939, pp. 50-51) that *C. bengalensis* is conspecific with *toulou* of Madagascar and Africa.

The new form is named in honor of Chamnong Theppahatsadin, District Officer at Khlung Khlung, who rendered to my party unusual courtesies and assistance.

Both Stresemann (Nov. Zool., vol. 19, 1912, pp. 336-339) and Peters (Check-list of Birds of the World, vol. 4, 1940, p. 72) have listed *javanensis* as the form of all the Philippine Islands. I should place there the population of Palawan, but find that those of other islands are separable by having, in fresh plumage, increased nigrescence of the anterior upper parts, the black or blackish area usually extending to the center of the back. For Philippine birds the name *molkenboeri* Bonaparte, 1850, is available.

III.

The great salty woodpecker of the middle third of the Mayal Peninsula has by some authors been called *harterti* (northwestern Burma), by others *pulverulentus* (Java). The population is in fact exactly and consistently intermediate in color between these two and might be called

***Mülleripicus pulverulentus celadinus*, subsp. nov.**

Type: U. S. Nat. Mus. No. 153742, adult male, collected at Ban Phra Muang [lat. 7°20' N., long. 99°30' E.], Trang Province, Thailand, on April 14, 1896, by William L. Abbott.

Diagnosis: The general tone of the slate-colored upper parts is distinctly paler (more bloomed) than the blackish slate of *pulverulentus*, but equally distinctly darker than the slate gray of *harterti*.

Range: Twelve specimens of *celadinus* have been seen from localities as far north as the Mergui District of southern Burma and as far south as the Siamese province of Trang.

Remarks: Specimens examined from Singapore and Johore agree with *pulverulentus* of Java and Borneo, and it is probable that the nominate race ranges throughout all but the northwestern Malay States and into Thailand in the provinces of Narathiwat, Yala, and Pattani. Skins from southwestern Thailand as far south as Prachuap Khiri Khan Province are inseparable from birds of northern Burma.

IV.

Recently collected material shows that one more form of the ruby-cheeked sunbird remains to be named from Thailand. I shall name it

***Anthreptes singalensis internotus*, subsp. nov.**

Type: U. S. Nat. Mus. No. 451383, adult male, collected at Ban Khlua Klang [ca. lat. 11°38' N., long. 99°36' E.], Prachuap Khiri Khan Province, Thailand, on December 25, 1952, by H. G. Deignan (original number 575).

Diagnosis: Belonging to that group of the races in which the ferruginous of the anterior under parts is not sharply defined from the yellow of the posterior under parts, *A. s. internotus* represents the expected link between *assamensis* of northern Thailand and *interpositus* of Thailand south of the Isthmus of Kra. The ferruginous of throat and upper breast is, in either sex, darker than in *assamensis*, paler than in *interpositus*, while the yellow of the remaining under parts is more greenish than in *assamensis*, more golden than in *interpositus*.

Range: Southwestern Thailand, from the headwaters of the river Mae Klong to the Isthmus of Kra; Tenasserim (Mergui District), probably north to the Tavoy District.

Remarks: Junge and Kooiman (Zool. Verh., No. 15, 1951, p. 36) refer three males of this population to *interpositus* after comparison with a series "from Pegu and Tenasserim." True *interpositus*, however, is restricted to the Malay Peninsula south of the Isthmus, and without examination of their material I cannot surmise which race or races actually lay before them.

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THE WISCONSIN PUMA

BY HARTLEY H. T. JACKSON

There are many records for the puma or cougar (*Felis concolor*) in Wisconsin, some of which have been assembled by W. E. Scott (Wisconsin Conserv. Bull. 4 (10): 25, 1939) and A. W. Schorger (Trans. Wisconsin Acad. Sciences, Arts and Letters 34: 31-32, 1942). Schorger also published an account of a mounted specimen in the collection of Lawrence College, Appleton, Wis. (Jour. Mammal. 19 (2): 252, May 14, 1938) which he later acquired for deposit in the University of Wisconsin Zoological Collection. The specimen was dismantled and made into a study skin with detached skull in 1948, at which time it was my privilege to examine it critically. A re-evaluation of measurements and other characteristics shows that this specimen represents an undescribed subspecies that inhabited the upper Mississippi Valley and western Great Lakes region. For permission to designate the specimen in the University of Wisconsin Zoological Collection as the type-specimen I thank Dr. John T. Emlen, Professor of Zoology at Wisconsin. The form is named for Dr. A. W. Schorger, Professor of Wildlife Management at the University, in recognition of his talent in salvaging specimens and historical records of extinct and vanishing species, collating the material, and making it available in publications.

Felis concolor schorgeri, subsp. nov.
Wisconsin Puma

Type-specimen.—No. 13,464, University of Wisconsin Zoological Collection; ♂ (sexed by describer) adult, skin (removed from mount and tanned) and skull; collected November 22, 1857, by Samuel P. Hart.

Type-locality.—Near Appleton, Outagamie County, Wisconsin.

Geographic range.—Now extirpated. Formerly from west-central Kansas (Ellis County) east and northeast to eastern Wisconsin and Duluth, Minnesota; probably also throughout most of Missouri and Illinois.

Diagnostic characters.—A large and apparently rather dark and reddish puma, larger than *Felis concolor coryi* and possibly nearly as large as *F. c. hippolestes*, and apparently darker. Original color of type-specimen indeterminate, the specimen having been mounted and exposed

to light while on exhibition for about 90 years. Skull large, the cranium posteriorly relatively rather narrow in comparison with other subspecies; the spread of the zygomatic arches somewhat reduced posteriorly. Compared with the skull of *F. c. hippolestes* that of *F. c. schorgeri* is rather narrow; particularly posteriorly; much flatter and more dishd in frontal region; zygomatic arch, particularly the malar part, broader; nasal breadth relatively and actually conspicuously greater; carnassial teeth, both upper and lower, larger. Compared with *Felis concolor coryi* the skull of *schorgeri* is somewhat larger and clearly approaches that of *coryi* only in the nasal breadth, which is even relatively greater in *schorgeri* than in *coryi*.

Measurements.—Type-specimen (adult male): No external measurements of the animal in the flesh are available. Prof. Walter E. Rogers, of Lawrence College, informed A. W. Schorger that the mounted specimen measured "27 inches in height at the shoulders and 85 inches in length from end of nose to tip of tail" (Schorger, Jour. Mammal. 19: 252, 1938). *Skull*: Type-specimen (adult male): Zygomatic width, 151.5 mm.; height of cranium, 73.8; interorbital breadth, 43.3; post-orbital processes (width), 75.6; width of nasals (at anterior tips of frontals), 22.6; width of palate (across interpterygoid fossa), 28.7; maxillary tooth row alveolar length, 65.0; upper carnassial crown length, 24.2; upper carnassial crown width, 13.2; lower carnassial crown length, 19.2; lower carnassial crown width, 15.2.

Specimens examined.—Kansas: Catherine, Ellis County, 1 (skull only, Kansas Univ. Mus.); Minnesota: Duluth, 1 (skull only, Amer. Mus. Nat. Hist.); Wisconsin: Appleton (near), 1 (type-specimen).

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STUDIES ON SPIROBOLOID MILLIPEDS. III. THE
GENUS *SPIROBOLINUS* SILVESTRI

BY RICHARD L. HOFFMAN

The preceding two parts of this series* have dealt with the rhinocericid genus *Eurhinocricus*, defining the genus on the basis of gonopod structure and giving a list of the known species. *Eurhinocricus* provided a good example of a group having come to include species entirely unrelated to the generotype; the present paper is concerned with a genus which, although adequately described, dropped into obscurity through the neglect of later workers, and which seems to be unknown to recent students of the group.

This is *Spirobolinus* of Silvestri, proposed in 1898 for two Ecuadorian species, and diagnosed in the following words (translated):

"Labrum tridentate. Mandibles pluripectinate. Labral pores 4—4. Antennae short. Collum laterally broad and not abbreviated. Pre-anal segment with a thickened elongate tail, exceeding the anal valves. Inner gonopods short."

Although the preceding diagnosis is scarcely usable in itself, the two included species were well described in general, and the gonopods of the males were illustrated in fair detail. Brolemann, however, could not utilize the original descriptions in his classification of the spiroboloid millipeds, and wrote (1914: 5): "*Spirobolinus* Silvestri (1898, n), aucun rapprochement comparatif, les figures ne nous renseignent sur aucun des points essentiels."

By 1926, nothing had been written in defense of the genus, and so *Spirobolinus* did not gain admission to Attems' treatment of the spiroboloids in the *Handbuch der Zoologie*, nor to Verhoeff's somewhat later (1932) summary of the group in Bronn's *Klassen und Ordnungen des Tierreichs*.

Fortunately, however, around the beginning of this century Silvestri and O. F. Cook exchanged a large number of paratypes of their milliped species, and it so happens in consequence that the United States National Museum has typical material of both *Spirobolinus luciae* and *S. nigrutilus*. Through the kindness of Dr. E. A. Chapin, I have been able to study these valuable specimens, and am pleased to be able to rescue this hapless genus from its undeserved sojourn into oblivion. It will be observed that the accompanying illustrations of *S. luciae* do not differ appreciably from Silvestri's drawings except in matters of small detail probably due to subjective errors of execution.

The paratype of *S. nigrutilus* in the National Museum is unfortunately

*Pt. 1. Proc. Biol. Soc. Washington, vol. 66, 1953, pp. 179-184.

Pt. 2. Proc. Biol. Soc. Washington, vol. 68, 1955, pp. —.

a female, and I can add nothing to the original description of that species.

Genus *SPIROBOLINUS* Silvestri

Spirobolinus Silvestri, 1898, Boll. Mus. Zool. Anat. comp. Univ. Torino, vol. 13, no. 324, p. 8 (proposed with two species).

Type.—*Spirobolinus luciae* Silvestri, by present designation.

Diagnosis.—A genus of the suborder Spirobolidea, characterized by the absence of pores from the 7th segment, and by the small posterior gonopods which apparently lack coxal elements. The pores appear to be located in the metazonite, but the segmental suture makes a wide loop caudad to pass behind and below the pore.

Small species, less than 30 mm long, segments smooth and unmodified, lacking scobinae. Labral pores 4 on each side; antennae with 4 sensory cones. Telson produced caudad and definitely surpassing the anal valves, latter of normal form without thickened margins. No tarsal pads in either sex. Anterior gonopods with well developed triangular sternite and slender, distally produced coxite elements. Posterior gonopods small, without sternite and apparently without coxites.

Range.—Ecuador.

Species.—Two.

Spirobolinus luciae Silvestri

Figs. 1-6

Spirobolinus luciae Silvestri, 1898, Boll. Mus. Zool. Anat. comp. Univ. Torino, vol. 13, no. 324, p. 8, figs. 1-4.

Description.—From adult male topoparatype (labeled Cotype by Silvestri), collected at Pun, Ecuador, by Enrico Festa.

About 30 mm long, 2.9 mm in diameter, with 44 segments.

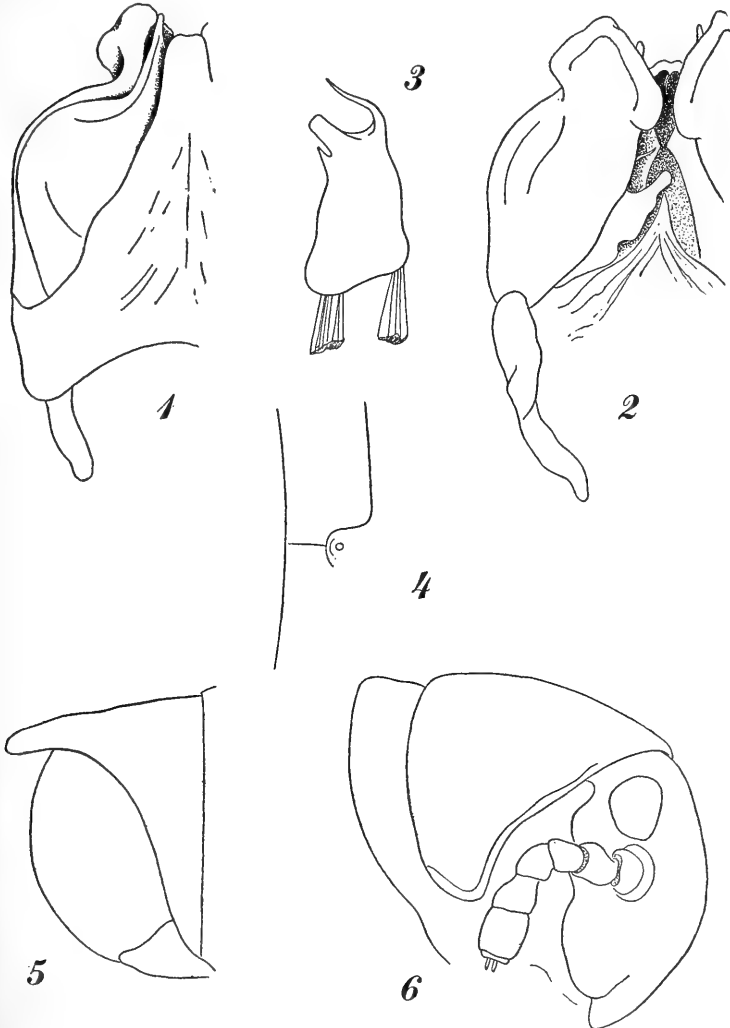
Color light brown, the dorsum paler, with a geminate middorsal stripe. In detail: yellowish brown or tan, somewhat darker on the sides below the pores and across dorsum of metazonites; each segment with a rectangular transverse black bar in front of the sulcus and a smaller spot in front of and behind it. Telson, front edge of collum, eyes, and a vertical frontal spot dark brown. Legs, antennae, and labral border yellowish.

Front of head smooth, clypeal pores 4—4; antennae short, not extending caudad past caudal edge of collum, the articles in decreasing order of length, 6-1-2-3-5-4-7; 4 terminal sensory cones; the proximal four articles almost glabrous. Mandibles rather deeply concave on their outer surface; sides of head below antennae immarginate. Eye patch small, rounded, about 25 ocelli in each cluster.

Collum smooth, narrowed somewhat toward the ends (fig. 6), its front edge with a marginal sulcus commencing just below level of eye patch. Second segment incurved ventrally, not as long as collum nor produced forward. Body segments smooth, with a distinct transverse sulcus across the dorsum but obsolete on the sides; the latter, especially of the prozonites, rather strongly striate near the legs; metazonites slightly raised above the level of the prozonites. Pores in a continuous series from the 6th to penultimate segment except that they are missing from the 7th; pores large and conspicuous, a small depression immediately caudad to each; pores well behind general level of the transverse sulcus which, however, is abruptly recurved caudad to pass behind them (fig. 4). No scobinae.

Telson smooth, without sulcus, produced into a depressed tail which considerably exceeds the anal valves (fig. 5), latter smooth and but slightly convex.

Male gonopods as illustrated (figs. 1 and 2). Sternal plate of anterior gonopods subtriangular, basally concave, distally exceeded by tips of both the coxites and telopodites, the latter considerably enlarged distally (fig. 2). Trachial stalks present, well sclerotized, firmly attached to base of sternite. Posterior gonopod small, flattened, without perceptible coxal joint and trachial stalk; distally modified into a long slender terminal process and a shorter, stouter subterminal process, the latter



subtended by a small tooth. Posterior gonopods concealed within the telopodite of the anterior pair, except for their tips (fig. 3).

Anterior legs of male without tarsal pads or other sexual modifications except that the coxae of the first few pairs are distally impressed or concave.

SYSTEMATIC POSITION

Having but one male specimen at my disposal, I am hesitant to make the step which will be necessary if my observations prove to be correct. That is, if the posterior gonopods actually consist of but a single piece, a new family will be required for the recognition of such a remarkable character. It is, of course, possible that a small coxal joint could have been broken off during dissection, although I made special efforts to prevent damage to the tiny appendage. But my drawing of this piece is quite similar to Silvestri's, and suggests that in fact the inner gonopod is fastened only by a band of muscle or ligament at each of its basal corners.

In other respects the genus appears similar to some of the Atopetholiidae of western North America, although a large triangular sternal plate is almost a characteristic of the family Rhinocricidae.

There is a possible junior synonym, in the form of Loomis's genus *Aporobolus* (1934), based upon a species from the island of Tobago. This species also lacks pores on the 7th segment, and has gonopods of the sort found in *Spirobolinus*. But until more material of both groups is at hand for comparison I think it best to keep them separate. Often a perfectly good name will become "lost" after unwarranted relegation to synonymy.

The classification of the spiroboloids is increasingly becoming incomprehensible through the proposals of new genera which are not compared by their authors with related established genera, and many founded upon mistaken concepts of anatomy. In the hope of abating the confusion I have begun to assemble materials for a revision of the order and hope to present in the near future an account of the genera so far erected and their type species.

Finally, it is some interest to observe that Silvestri overlooked the absence of pores from the 7th segment, since he normally placed great taxonomic significance to the distribution of the pore series, and separated more than a few spirostreptoid genera chiefly on such a basis.

LITERATURE CITED

- Broleman, Henry W., 1914. Etude sur les Spirobolides (Myriapodes). Ann. Soc. Entom. France, vol. 83, pp. 1-38, fig. I-IX.
 Loomis, H. F., 1934, Millipeds of the West Indies and Guiana collected by the Allison V. Armour Expedition in 1932. Smithsonian Misc. Coll., vol. 89. No. 14. pp. 1-69. 33 figs.
 Silvestri, F., 1898. Viaggio del Dott. Festa nella Repubblica del Ecuador. XI. Diplopodi. Boll. Mus. Zool. ed Anat. comp. R. Univ. Torino, vol. 13, no. 324, pp. 1-12.

Explanation of Plate

Fig. 1. Left side of anterior gonopods, cephalic aspect. 2. Right side of anterior gonopods, caudal aspect, showing the largely concealed posterior gonopod. 3. Left posterior gonopod. 4. Repugnatorial pore on right side of body, showing position of segmental sutures. 5. Lateral aspect of caudal end of body, from right side of body. 6. Outline sketch of head capsule, antenna, and collum.

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THE TYPE LOCALITY OF *HYLA TRISERIATA* WIED

BY FRANCIS HARPER

The original description of this chorus frog (currently known as *Pseudacris nigrita triseriata*) occurs in the classic work of Maximilian Prinz zu Wied (1839, 1:249). The type locality has customarily been recorded as Mt. Vernon, Ohio River, Indiana. This is situated in Posey County, in the extreme southwestern corner of the state. I am not aware of any particular discussion of the type locality except that by Smith and Smith (1952: 176): "The exact spot visited by Wied . . . could not be determined from his narrative. Since he traveled by boat the type specimen, presumably, was collected in the Ohio River bottom-lands."

There is considerably more, however, to be said on the subject. In the original work (1839: 217) the author writes of leaving New Harmony (on the Wabash River, about a dozen miles north of Mt. Vernon) by horseback early in the morning on March 16, 1833, traveling overland, crossing Rush Creek and Big Creek, and reaching Mt. Vernon by mid-day. Meanwhile,

"In the woodland pools and little sloughs of the recesses between the hills we heard the trilling of a small greenish-gray hylid, which does not seem to occur in Pennsylvania. As soon as one approached the pools, the little animals betook themselves into the mud and roiled the water. If one withdrew, their united voices were audible at quite a distance." (Translated from the original German.)

These remarks are introduced between the crossings of Rush Creek and Big Creek. The detailed description, with proposal of the name *Hyla triseriata*, follows on pages 249-250. In a much later publication (1865: 118) Maximilian states that the species was found first in the woodland pools and sloughs near New Harmony, later at Mt. Vernon on the Ohio, and on the Mississippi. The voice was heard by 9 a.m. The specimens were subsequently lost; consequently no type is extant.

The above quotations from Maximilian's narrative seem to furnish sufficient grounds for restricting the type locality to the area between Rush Creek and Big Creek, along the route from New Harmony to Mt. Vernon, in Posey County, Indiana (New Harmony quadrangle, 1903, U. S. Geol. Survey).

The advantage of such a course becomes apparant from the following remarks by Smith and Smith (1952: 176), who wrote under the impression that Mt. Vernon is the proper type locality:

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"Six topotypes [from Mt. Vernon] collected by us are intergrades [between *feriarum* and *triseriata*] but show closer affinities to *feriarum*. . . .

"A much more adequate sample (36 specimens) was obtained four miles south of New Harmony (still in Posey County but out of the river valley) and this consists of definite intergrades which do approach *triseriata* more closely than *feriarum* in the character of leg length and dorsal pattern."

Thus, by restricting the type locality to the near vicinity of New Harmony, we may avoid all the nomenclatural confusion that would result from relegating *Helocaetes feriarum* Baird (1854) to the synonymy of *Hyla triseriata* Wied (1839) and at the same time applying some different name to the subspecies that has long been known as *triseriata*. *Pseudacris nigrita feriarum* (Baird) may therefore remain as the name of the more eastern subspecies, ranging, according to Smith and Smith (1952: 174, fig. 2), from New Jersey and Pennsylvania southwestward to Texas.

Since Rush Creek is approximately 4 miles south of New Harmony, the 36 specimens mentioned above (Smith and Smith, 1952: 176) may be regarded as virtual topotypes of *triseriata*.

LITERATURE CITED

- Smith, Philip W., and Dorothy M. Smith, 1952. The relationship of the chorus frogs, *Pseudacris nigrita feriarum* and *Pseudacris n. triseriata*. *Am. Midland Naturalist* 48(1): 165-180, 1 pl., 1 fig., 1 map.
- Wied, Maximilian Prinz zu, 1839. Reise in das innere Nord-America in den Jahren 1832 bis 1834. Vol. 1. Coblenz: xvi+653+[1], 20 pl., 33 fig.
- , 1865. Verzeichniss der Reptilien, welche auf einer Reise im nördlichen America beobachtet wurden. Dresden: viii+141+[2], 7 pl.

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THE DIAMONDBACK TERRAPINS (*MALACLEMYS*
TERRAPIN) OF PENINSULAR FLORIDA

BY ALBERT SCHWARTZ

The Charleston Museum, Charleston, S. C.

As presently understood, three subspecies of diamondback terrapins (*Malaclemys terrapin*) inhabit the coastal waters of the Florida Peninsula and the Florida Keys. As mapped by Carr (1952: 164) the ranges of these three forms are: *Malaclemys t. macrospilota*, Florida west coast; *Malaclemys t. centrata*, Florida east coast, south to about Palm Beach County; *Malaclemys t. rhizophorarum*, Florida Keys, integrading with *M. t. centrata* along the southeastern coast and with *M. t. macrospilota* in the region of Cape Sable.

Recent acquisition of fresh material from the Florida east coast and the coast of South Carolina indicates that the status of the diamondback turtles from the former locality is not as Carr indicated. In addition to material in the collection of the Charleston Museum, I have examined specimens from various institutions, and wish to extend my thanks for the loan of turtles to the following curators of collections: Charles M. Bogert and Richard G. Zweifel, American Museum of Natural History (AMNH); Arthur Loveridge, Museum of Comparative Zoology (MCZ); Archie F. Carr and Duke Wilder, University of Florida (UF); Norman E. Hartweg and William E. Duellman, Museum of Zoology, University of Michigan (UMMZ), and Doris M. Cochran, United States National Museum (USNM). Numerous persons have aided in the collection of specimens of *Malaclemys*, and I wish to thank L. Neil Bell, Julian R. Harrison III, Raymond P. Porter, John A. Quinby, and Ephie C. Seabrook for their assistance. Shell measurements follow Carr (1952), and all measurements are in millimeters.

Malaclemys t. rhizophorarum was described by Fowler (1906) as *Malaclemmys littoralis rhizophorarum*, from a single specimen taken at Boca Grande Key, Monroe County, Florida. Boca Grande lies between Key West and the Marquesas. Carr (1946) resurrected the name *rhizophorarum*, after many years of disuse, for the diamondback terrapins of the Florida Keys, on the basis of a new specimen from Card Sound, Dade County, Florida, and the examination of turtles from the lower portion of the Florida Peninsula. *Malaclemys t. macrospilota* was described by Hay in 1905, from material taken at Charlotte Harbor, Florida, and the Florida West Coast; this Gulf Coast subspecies is readily separable from the Atlantic Coast material by virtue of the clear and sharply differentiated centers of the carapace laminae. *Malaclemys*

t. centrata was first described from Carolina by Latreille in 1801, and later the type locality was restricted to Charleston, South Carolina, by Hay (1905:6).

Examination of specimens from the east coast of Florida demonstrates that this region is inhabited by turtles which cannot be assigned to any of the named subspecies of *Malaclemys terrapin*. The Florida east coast areas were in the past the home of the Tequesta Indians and it seems appropriate to name the new subspecies after these early Americans for whom, almost certainly, the diamondback terrapin was an item of diet. The new subspecies may be known as

***Malaclemys terrapin tequesta*, new sub species**

Holotype: UMMZ 108482, an adult female from Miami Beach, Dade County, Florida, taken June, 1953, by Donald de Sylva.

Paratypes: All from Florida, as follows: *Volusia Co.*, New Smyrna, (USNM 37020) Daytona Beach (UF 4242); *Brevard Co.*, $\frac{1}{2}$ mi. E junction Florida AIA and Florida 520 (UF 6589, UF 6590), 1.3 mi. E Merritt Island (UMMZ 106149, UMMZ 106150), 2 mi. E Merritt Island (UMMZ 106148), 5 mi. E Merritt Island (UMMZ 106151), 5.2 mi. E Merritt Island (UMMZ 106147), Eau Gallie (MCZ 20287); *Indian River Co.*, Sebastian (MCZ 48787).

Diagnosis: A diamondback turtle without strikingly differentiated trans-cucent centers or a pattern of concentric circles on the carapace laminae, and without black edging on the seams of the ventral surface of the marginal laminae. Carapace slightly keeled, broad, flattened, and horn-colored, occasionally carapace laminae cleared to show remnants of juvenile pattern; plastron either immaculate or with various dark patterns, either seam following, radiating from the posterior corner of the plastral laminae, or consisting of rectangular black hollow figures on each plastral lamina. Ventral surface of marginal laminae at level of bridge usually without a continuation of the dorsal pattern or with this pattern very obscure and poorly defined, and with a black blotch at the posterodorsal corner of the ventral surface of the marginals at the level of the bridge. Head skin variously mottled or stippled with dark gray on light gray background, but never with dark spots fused into lines. Juveniles usually without concentric rings on carapace laminae and dorsal surface of marginals, rarely with no more than two concentric rings on each lamina; usually each carapace and marginal lamina stippled with gray; if present, one (usually) to five (rarely) dark spots in the center of each lamina. Dorsal tubercles bulbous and either light or dark, that on central lamina 4 most pronounced. Plastron either uniformly lightly stippled with gray, or with each plastral lamina containing a square or triangular hollow dark figure which follows the configuration of the lamina but does not touch the seams.

Distribution: The east coast of the Florida Peninsula, from at least Volusia County south to Dade County.

Description of holotype: An adult female with the following measurements: Carapace length, 178; length of plastron, 157; length of anterior lobe of plastron, 41.0; length of middle lobe of plastron, 53.1; length

of posterior lobe of plastron, 63.2; head width, 37.2; depth, 72; width of posterior lobe of plastron, 82.8; width of bridge, 48.5; greatest width of carapace (at marginal 7), 139.

The carapace is generally dark or horn-colored, the central laminae uniformly so. Each lateral lamina is lighter centrally, and one to several heavy brown spots are visible through the lighter center. The marginals are lighter than the laterals and a bold, open-sided square figure is visible on the dorsal surface of each marginal. The plastron is yellow and the central seam is widely bordered with dark radiating lines. Each plastral lamina shows the remnants of the triangular or rectangular hollow figure noted above as occurring in juveniles, and these plastral figures are somewhat obscured by additional dark pigment. The ventral surfaces of the marginal laminae show a hollow, poorly defined C-shaped figure, the open side directed dorsally, and marginals 4 to 9 on each side have a brown blotch on the posterodorsal corner. The head skin is light gray and boldly spotted with black. The nasal shield is heavily stippled with black, and a black border occurs along its posterior third. The neck and fore limbs are light gray, spotted with black, while the hind limbs and rump are almost uniformly gray. *Variation:* The eleven adult specimens of *M. t. tequesta* (ten females and one male) show little variation compared to the holotype. All are broad and flattened, when compared to *M. t. centrata*, and all have the horn-colored carapace of the type. None shows any indication of the concentric circles on the carapace laminae, persistently characteristic in *M. t. centrata*, and three females (UF 6589, UF 4242, UMMZ 106151) have the centers of the carapace laminae somewhat lighter, so that the remnants of the juvenile pattern (incomplete or diffuse circle or large brown dots) are still visible. All except two (UF 6589, UF 4242) have the dark blotch on the ventral surface of the marginals at the level of the bridge. The head skin is gray and either lightly and uniformly stippled, or with dark spots; the nasal shield varies from pale gray and immaculate, to solid black. The dorsal keels are but slightly tuberculate; the single male (MCZ 48787) has the keel on central 4 more bulbous than those on the preceding two centrals, and likewise more bulbous than the keels of any of the females.

The outline of the shell of *M. t. tequesta* is more nearly oval than that of the remaining Floridian subspecies, and the carapace laminae show conspicuous concentric grooves.

Comparisons: *Malaclemys t. tequesta* requires comparison with the three Floridian subspecies of the genus. The new form can easily be distinguished from *M. t. macrospilota* since the latter has translucent yellowish areas in the centers of the carapace laminae. *M. t. tequesta* shows occasional lightening of the carapace lamina but it is never so pronounced as in *M. t. macrospilota* and the clear areas are not so abruptly differentiated in the new subspecies, the transition between the horn-colored peripheries and the clear centers being very gradual. *M. t. tequesta* is also a broader and flatter turtle than *M. t. macrospilota*, and has a more oval outline than the west coast subspecies. Juveniles of *M. t. macrospilota* differ from those of *M. t. tequesta* in that the carapace laminae of the former subspecies are usually heavily spotted with black and each lamina is heavily black bordered. Concentric

rings are absent on the lateral and central laminae on juvenile *M. t. macrospilota*. If the heavy spotting is absent on the lateral laminae of *M. t. macrospilota*, there is usually a single prominent black spot in the center of each lateral lamina. The bulbous keels on the centrals of juvenile *M. t. macrospilota* are somewhat more pronounced than those of *M. t. tequesta*.

From *M. t. centrata*, *M. t. tequesta* differs in the absence of dark greenish or gray concentric rings on the light gray or green carapace laminae, and the presence of a dark blotch on the ventral surface of the marginal laminae at the level of the bridge. In *M. t. centrata*, the pattern of the dorsal surface of each marginal lamina continues onto the ventral surface of the same lamina as a square or rectangular figure. In *M. t. tequesta*, such ventral continuation of the marginal lamina pattern is either completely absent or is but faintly indicated. The juveniles of these two subspecies are easily differentiated. Juvenile *M. t. centrata* have three or more concentric rings in each lateral lamina, and a complex figure consisting of a combination of stippling and lines and/or rings on each central. The continuation of the marginal pattern from the dorsal to the ventral surface of each marginal lamina, noted in adult *M. t. centrata*, is even more conspicuous in juveniles. In juvenile *M. t. tequesta*, there are never more than two concentric rings in each carapace lamina, and these are poorly defined and occur in only five of sixteen juveniles. The bulbous keels of the centrals are very pronounced in juvenile *M. t. tequesta*, while the keels of juvenile *M. t. centrata* are not bulbous but are rather a linear, almost parallel sided, series. Carr (1952:175) shows an excellent photograph of hatching *M. t. centrata* from Beaufort, North Carolina, and a series of twelve hatchlings from South Carolina and Savannah, Georgia, agree well with his photograph. The expansion of the keels in hatchling *M. t. tequesta* is reminiscent of the same condition in juvenile *M. t. macrospilota*.

There are four specimens of *Malaclemys* (other than the type of *M. t. rhizophorarum* from the Florida Keys available to me. One of these (USNM 37021, adult female, Key West) is typical of *M. t. macrospilota*. This individual was taken many years ago and, since it does not agree with the remaining three specimens from the Florida Keys, it is suspected that this individual was captured by commercial fishermen along the lower west coast of Florida and brought to Key West, where it was purchased and later deposited in the United States National Museum. The remaining three specimens (MCZ 1848, adult female, MCZ 1849, adult male, both from the Marquesas, Monroe County, Florida; AMNH 4745, juvenile, from Plantas, Key Long, Monroe County, Florida) differ in detail from *M. t. tequesta* and *M. t. macrospilota*, and are considered to represent *M. t. rhizophorarum*. I am unable to locate 'Plantas, Key Long' on any map; however, there has been, near the present site of the town of Tavernier, a settlement of Planter on Key Largo, and I suspect that the juvenile is really from this locality rather than 'Plantas, Key Long'.

Compared with the figure of *M. t. rhizophorarum* (Fowler, 1906), the two adults from the Marquesas show the black edging on the ventral surface of the marginal laminae (which Fowler considered diagnostic

of *M. t. rhizophorarum*) and the black pigmentation radiating from the plastral seams. This condition occurs in *M. t. macrospilota*, as demonstrated in three adult females (UMMZ 104023, 109544, 109545) from Cedar Key, Levy County, Florida. However, no other specimen shows the fusion of dark spots on the head, giving the head a boldly streaked appearance, as do the two adults from the Marquesas. The juvenile from Key Largo shows the same head pattern condition, and the carapace is also very distinctly marked. Each lateral lamina has a bold, broad, doughnut-shaped figure, hollow on laterals 1 to 3, and solid on lateral 4. Central 1 has a W-shaped black figure, the open end directed anteriorly. The precentral and marginals 1 to 7 have a solid black blotch on the dorsal surfaces, while marginals 8 to 11 have a bold, C-shaped figure, the open end directed toward the periphery of the shell. Centrals 2 to 4 have each a dark bulbous keel, crossed by a black bar. The plastral laminae are boldly spotted, with one to four spots on each lamina. The lateral ends of the pectoral and abdominal laminae each have a large black spot, and the ventral surface of each marginal likewise is marked with a black spot. These markings on the juvenile from Key Largo differ radically from those of any other juvenile examined, and, if characteristic of the populations of *Malaclemys* from the Florida Keys, are sufficiently distinct to separate the key juveniles from those of the mainland. Detailed comparison of this juvenile *M. t. rhizophorarum* with those of *M. t. centrata*, *M. t. macrospilota*, or *M. t. macrospilota*, or *M. t. tequesta* is unnecessary. Adult *M. t. rhizophorarum* can be distinguished from *M. t. tequesta* by the fused and bold head spots, the absence of a dark spot on the ventral surface of the marginal laminae, and the presence of black borders on the ventral surface of the marginals. From *M. t. macrospilota*, the key turtles may be distinguished by the head markings and by the absence of clear centers of the carapace laminae. Much additional fresh material is needed before adequate assessment of the differentiating characters of *M. t. rhizophorarum* can be made. For the present it seems preferable to regard the mangrove terrapin as a distinct subspecies.

Inspection of Table 1 shows that female *M. t. tequesta* average larger in measurements of carapace length, anterior lobe length, posterior length, posterior lobe width, depth, and carapace width; the differences are not striking, however. The ratio of depth over length of posterior lobe of plastron will separate most female specimens of *M. t. centrata* from female *M. t. tequesta*; only two individuals (out of 20) of the former subspecies have this ratio in excess of 1.07, while this ratio in *M. t. tequesta* ranges between 1.07 and 1.19. Likewise, only six specimens of *M. t. centrata* have the ratio of carapace width over posterior lobe length greater than 1.99, while this ratio in *M. t. tequesta* ranges between 1.99 and 2.26. The ratio of depth over posterior lobe length averages equally in female *M. t. tequesta* and female *M. t. macrospilota*, and the ratio of carapace width over posterior lobe length averages less in *M. t. macrospilota* than in *M. t. tequesta*, although the extremes are identical.

Adequate series of males of the Floridian races of *Malaclemys terrapin*, as well as *M. t. centrata*, are not available for comparison.

I have examined nine male *M. t. macrospilota*, three male *M. t. centrata*, and one male each of *M. t. tequesta* and *M. t. rhizophorarum*. On the basis of this limited material, the following observations can be made. Male *M. t. macrospilota* have the light centers of the carapace laminae typical of this race, but old individuals may have this character obscured. In young males the carapace keel is bulbous, especially on centrals 3 and 4, but older individuals have the bulbous terminations less prominent and worn. *M. t. centrata* males show the dark gray or green concentric circles on the carapace laminae and the keel of the carapace is not bulbous, but rather a series of rather sharp carinae occur on centrals 2 to 4, with the keel on central 4 most pronounced. The single male *M. t. tequesta* is almost uniformly horn-colored dorsally, with the lateral laminae only slightly translucent. The dorsal keel is bulbous (especially on centrals 3 and 4), but not so prominent as in male *M. t. macrospilota*. The ventral surface of the marginals at the bridge level have the customary brown blotch typical of the subspecies. The male *M. t. rhizophorarum* is quite dark (almost black) above, and the central keel of the carapace is bulbous on centrals 2 and 4, but less pronounced than in *M. t. macrospilota* and *M. t. tequesta*. The ventral surface of the marginals shows the typical black seams, and the head shows the fusion of blotches characteristic of this subspecies. Measurements and proportions are shown in Table 2. From these data it appears that *M. t. macrospilota* males average larger than those of the three southeastern subspecies, and that male *M. t. centrata* can be separated from male *M. t. macrospilota* on the basis of the ratio of carapace width over length of posterior lobe of plastron. The single male *M. t. rhizophorarum* has a higher ratio of carapace width over length of posterior lobe of plastron than any other male examined, and additional specimens from the Florida Keys may indicate that this ratio will separate key specimens from the remaining Floridian subspecies.

The areas of intergradation between *M. t. tequesta* and *M. t. rhizophorarum* to the south, and between the former subspecies and *M. t. centrata* to the north are unknown. Intergrades between *M. t. tequesta* and *M. t. rhizophorarum* might be expected on the southern coast of Florida and upon the Upper Keys. Carr's (1952:178) specimen from Card Sound, Dade County, may be an intergrade or, judging from the blotchy head markings, may represent *M. t. rhizophorarum*. Determination cannot be made from the photograph, and the specimen cannot presently be located. *M. t. tequesta* is known from Volusia County, Florida and *M. t. centrata* occurs as far south as Glynn County, Georgia. Intergrades between these two forms are expected in the intervening area. Johnson (1952:100) reported a specimen of *M. t. rhizophorarum* from Key Island, south of Naples, Collier County, Florida. I have not examined this individual, but on geographic grounds it would be expected to be referable to *M. t. macrospilota*. Johnson's comment that his specimen represents an immigrant *M. t. rhizophorarum* into an otherwise pure population of *M. t. macrospilota* is a possibility. *Specimens examined* (except paratypes of *M. t. tequesta*)—*M. t. centrata*: South Carolina, Charleston Co., nr. Charleston, 1; Cooper River, North Charles, 1; Charleston, 4; Morris Island, 8; Sol Legare Flats, 7.7

mi. SSW Charleston, 4; Stono River, Edgewater Park 1; Folly Island, 6; Clark's Sound, James Island, 2; Clark's Sound, Folly River, 3; Edisto Island, 1; Beaufort Co., Parris Island, 1. *Georgia*, Chatham Co., Savannah, 3; Glynn Co., no other locality, 6. *M. t. tequesta*: Florida, Brevard Co., nr. Melbourne, 2; nr. Merritt Island, 14. *M. t. rhizophorarum*: Florida, Monroe Co., Planter, Key Largo, 1; Marquesas, 2. *M. t. macrospilota*: Florida, between Dixie and Levy cos., mouth of Suwannee River, 12; Levy Co., Cedar Key, 7; Pinellas Co., Passagrille, 1; Gulfport, 3; Hillsborough Co., no other locality, 1; Manatee Co., Bradenton, 1; Collier Co., Marco Island, 4; 3.3 mi. SW Royal Palm Hammock State Park, 1; Monroe Co., Key West (?), 1.

LITERATURE CITED

- Carr, Archie F. 1946. Status of the mangrove terrapin. *Copeia*, 3:170-2.
 ———, 1952. Handbook of turtles. Comstock Publishing Associates, Ithaca, N. Y., i-xv, 1-542.
 Fowler, Henry W. 1906. Some cold-blooded vertebrates of the Florida Keys. *Proc. Acad. Nat. Sci. Phila.*, 59:77-113.
 Hay, W. P. 1905. A revision of *Malaclemmys*, a genus of turtles. *Bull. U. S. Bureau Fish.*, 24:1-20.
 Johnson, William R. 1952. Range of *Malaclemmys terrapin rhizophorarum* on the west coast of Florida. *Herpet.*, 8(3):100.

TABLE 1.

	20 <i>M. t. centrata</i>	11 <i>M. t. tequesta</i>	15 <i>M. t. macrospilota</i>	1 <i>M. t. rhizophorarum</i>
Carapace length	170.0 (140-192)	180.4 (161-200)	178.7 (167-194)	172
Plastral length	153.2 (125-176)	160.5 (144-179)	160.7 (134-177)	155
Anterior lobe length	38.1 (32.8-43.4)	43.5 (37.5-48.9)	40.7 (32.5-44.8)	42.6
Middle lobe length	50.7 (41.1-61.3)	53.0 (44.7-61.1)	55.2 (43.5-64.4)	54.1
Posterior lobe length	63.5 (50.9-74.8)	64.3 (57.9-72.6)	64.1 (55.1-70.0)	57.8
Head width	34.7 (28.4-42.0)	35.4 (32.6-38.6)	36.2 (30.0-39.5)	32.0
Depth	64.4 (56-75)	72.2 (64-80)	72.0 (59-82)	68
Width posterior lobe	81.1 (69.5-90.2)	84.7 (70.5-94.2)	82.4 (71.5-89.7)	73.4
Width bridge	46.2 (37.9-54.4)	50.6 (44.1-57.0)	52.9 (41.0-58.7)	51.7
Carapace width	124.3 (111-141)	137.0 (119-152)	134.4 (110-145)	122.2
D/PLL	1.02 (.92-1.16)	1.12 (1.07-1.19)	1.12 (.99-1.23)	1.18
CW/PLL	1.99 (1.81-2.33)	2.13 (1.99-2.26)	2.09 (1.99-2.23)	2.11

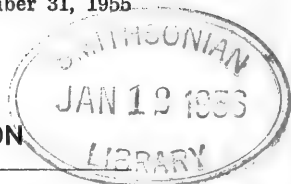
Table 1. Measurements and ratios (means and extremes) of female specimens of four subspecies of *Malaclemmys terrapin*. Abbreviations: D, depth; CW, carapace width; PLL, length of posterior lobe of plastron.

TABLE 2.

	3 <i>M. t. centrata</i>	1 <i>M. t. tequesta</i>	9 <i>M. t. macrospilota</i>	1 <i>M. t. rhizophorarum</i>
Carapace length	120.1 (112.8-128.6)	119.4	128.0 (109.4-143.9)	117.0
Pastral length	102.4 (91.4-110.1)	99.4	110.7 (93.9-122.7)	97.7
Anterior lobe length	25.9 (24.0-27.3)	26.0	28.8 (23.7-31.6)	27.0
Middle lobe length	33.4 (29.8-37.1)	30.5	37.0 (30.6-50.2)	32.1
Posterior lobe length	43.9 (37.8-47.3)	42.7	45.4 (39.0-50.2)	38.4
Head width	21.7 (20.7-23.0)	21.6	23.6 (20.6-27.1)	20.5
Depth	43.7 (42-46)	45	47.3 (41-53)	40
Width posterior lobe	53.9 (50.0-57.2)	50.0	57.6 (49.7-64.4)	49.6
Width bridge	30.0 (25.7-33.2)	28.4	35.4 (29.9-40.3)	33.8
Carapace width	87.4 (77.0-93.1)	92.8	95.2 (82.9-107.0)	87.0
D/PLL	1.00 (.91-1.10)	1.05	1.04 (.94-1.11)	1.04
CW/PLL	1.99 (1.97-2.04)	2.17	2.10 (2.05-2.17)	2.27

Table 2. Measurements and ratios (means and extremes) of male specimens of four subspecies of *Malaclemys terrapin*. Abbreviations in Table 1.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



A NEW SPECIES OF BAT (GENUS *MYOTIS*) FROM
COAHUILA, MÉXICO

BY ROLLIN H. BAKER

On the evening of June 24, 1952, Albert A. Alcorn shot a small bat as it circled over a water-filled earthen tank situated in an open, intermontane valley near Bella Unión, Coahuila. This unique bat belongs to the genus *Myotis* but owing to its small size and flattened skull is not assignable to any known species of this genus; the bat is named and described as follows:

Myotis planiceps new species

Type.—Male, adult, skin and skull, No. 48242, Univ. Kansas Mus. Nat. Hist.; 7 mi. S and 4 mi. E Bella Unión, 7200 ft., Coahuila; 24 June 1952; obtained by Albert A. Alcorn, original number 920.

Distribution.—Known only from the type locality.

Diagnosis.—Size small for the genus, forearm distinctively short (see measurements); ears and membranes dark; pelage glossy and long (maximum length of hairs on middle of back, 8.2 mm.), hairs of upper parts basally dark and tipped with (*j* 16) Cinnamon-Brown (capitalized color term is that of Ridgway, Color Standards and Color Nomenclature, Washington, D. C., 1912), hairs of underparts basally black and tipped with buffy; skull small and flattened (see figure 1), rostrum narrowing anteriorly; teeth small; first and second premolars, both above and below, when viewed from occlusal surfaces, approximately the same size and uncrowded.

Comparisons.—*Myotis planiceps* is distinguished from all other North American *Myotis* by its short forearm, greatly flattened cranium and small teeth. Superficially, *M. planiceps* bears some resemblance to the three species, *Myotis californicus* (Audubon and Bachman), *Myotis subulatus* (Say) and *Myotis lucifugus* (LeConte), but differs from them in the above respects and also in having smaller ears, a more pointed rostrum and the occlusal surfaces of the 1st and 2nd premolars, both upper and lower, more nearly equal. From *M. californicus*, *M. planiceps* differs also in having more prominent metalophs and hypocones on the first and second upper molars. From *M. subulatus*, *M. planiceps* differs also in having more prominent metalophs and protoconules on the first and second upper molars and in having the crown of the third upper molar more shortened anteroposteriorly with no hypocone. From *M. lucifugus*, *M. planiceps* differs also in having a smaller hind foot, a slight keel on the calcar, less developed metalophs and hypocones on the first and second upper molars, and crown of the third upper molar more shortened anteroposteriorly with no hypocone and metaconule.

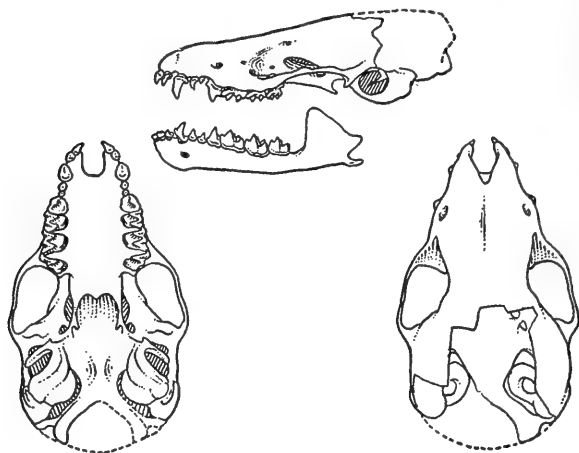


Fig. 1. *Myotis planiceps*, No. 48242, Univ. Kansas Mus. Nat. Hist., holotype. From left to right, ventral, lateral with lower jaw, and dorsal views of skull. All X3.

Remarks.—Probably *M. planiceps* is more closely allied to *M. californicus* than to any other *Myotis*. The cranium of *M. planiceps* is much more flattened than in *M. subulatus*. This flatness in *M. planiceps* is easily seen even though the hindmost part of the braincase is gone (see fig. 1). The occlusal surface of the upper molariform teeth is small in comparison with the area of the palatal surface. The distance across the third upper molars, from the outer side of one tooth to the outer side of the other, is 4.9, and the space across the palate between the inner borders of these two teeth measures 2.5.

This one bat was taken at 7200 feet elevation in a heavily grazed valley surrounded by higher mountains covered with boreal forests. It is suspected that this species lives in montane areas.

Measurements.—Measurements, in millimeters, of the holotype are: total length, 76; length of tail vertebrae, 25; length of hind foot, 8; height of ear from notch, 10; length of forearm, 26.5; length of thumb, 3.8; length of third metacarpal, 24.3; length of fifth metacarpal, 23.3; condylobasal length of skull, 13.3; zygomatic breadth, 8.1; least inter-orbital constriction, 3.4; breadth of braincase, 7.1; mastoid breadth, 7.2; palatal length, 6.7; maxillary breadth, across M3, 4.9; length of mandible, 7.3; length of maxillary tooth-row, 4.9; length of mandibular tooth-row, 6.2.

Specimen examined.—One, from the type locality.

Transmitted June 8, 1955.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



THREE NEW RODENTS OF THE GENERA *MICROMYS*
AND *APODEMUS* FROM KOREA

BY DAVID H. JOHNSON¹ AND J. KNOX JONES, JR.²

The study of a collection of mammals from southern Korea and Cheju Do (Quelpart Island) has revealed the existence there of three new murine rodents, one in the genus *Micromys* and two in the genus *Apodemus*.

A systematic study of Korean mammals is being conducted at the United States National Museum in cooperation with the Commission on Hemorrhagic Fever of the Armed Forces Epidemiological Board and the Army Medical Service Graduate School. This paper represents the first contribution from the cooperative venture.

All measurements are in millimeters. Basal length was taken from the anterior inferior border of the foramen magnum to the anteriormost point on the incisors. Capitalized color terms are from Ridgway (1912).

Micromys minutus hertigi, new subspecies

Type.—Adult female in summer pelage, skin and skull, United States National Museum no. 299104, from 2 miles southeast of Mosulp'o, 3 meters, Cheju Do (Quelpart Island), Korea; obtained 11 September 1954 by Warren D. Thomas, original no. 1675 of J. Knox Jones, Jr.

Distribution.—Known only from the type locality.

Diagnosis.—Upper parts bright ochraceous; skull large; nasals long, slender and tapering posteriorly; zygomatic notch deep.

Description.—Size: Large for species (see measurements); tail longer than head and body. Color: Upper parts (summer pelage) uniformly bright ochraceous (between Ochraceous-Tawny and Ochraceous-Orange), finely lined with black hairs; flanks slightly paler in color, bases of hairs gray; lateral line near Ochraceous-Buff; underparts white; feet pale yellow above, slightly darker below; ears essentially same as dorsum; tail sparsely haired and bicolor, dark above, pale yellowish below; vibrissae black. Skull: Large, massive and relatively narrow (see measurements); nasals long, slender and tapering posteriorly; rostrum broad across nasolachrymal capsules; zygomatic region massive, arches relatively narrow and constricted slightly across jugals; zygomatic notch (at anterior opening of infraorbital foramen as viewed from above) deep; zygomatic processes of maxillae and squamosals broad and massive in lateral view; braincase and interorbital region

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Table 1. Cranial measurements of several subspecies of *Micromys minutus*

	Oecipitonasal length	Nasal length	Basal length	Zygomatic breadth	Breadth of braincase	Depth of braincase	Palatal length	Length of upper molar-form toothrow	Length of lower molar-form toothrow	Interorbital breadth
<i>Micromys minutus hertigi</i> , 2 mi. SE Mosulp'o, Cheju Do, Korea										
USNM 299103 ♂					9.7	6.1			3.0	
USNM 299104 ♀ (type)	21.5	7.1	17.2	10.0	9.8	6.3	10.0	3.3	3.1	3.8
<i>Micromys minutus ussuricus</i> , various localities in central Korea										
Average 7 (2 ♂, 5 ♀)	19.5	6.0*	16.1	9.4*	9.2	6.1	9.5	3.2	3.0	3.4
Minimum	18.8	5.7	15.5	9.3	9.0	5.6	9.2	3.0	2.8	3.2
Maximum	20.1	6.5	17.2	9.6	9.4	6.3	9.9	3.4	3.1	3.6
<i>Micromys minutus ussuricus</i> , 5 mi. W Kwangju, Korea										
USNM 299100 ♂	19.2	6.5	15.9	9.4	9.2	6.3	9.4	3.1	2.8	3.4
USNM 299101 ♂		6.9		9.8	9.4		9.9	3.2	2.9	3.5
<i>Micromys minutus pygmaeus</i> , Yochow, Hunan, China										
USNM 239537 ♀	21.1	6.9	17.3	9.8	9.3	6.7	10.2	3.2	3.0	3.7
USNM 239539 ♀	20.0	6.6	16.1	9.9	9.4	6.4	9.7	3.1	3.0	3.3

* 6 specimens

broad; braincase relatively shallow; toothrows relatively short; mesopterygoid fossa narrow, pterygoids not especially divergent posteriorly; incisive foramina narrow, not reaching level of molariform toothrow; auditory bullae only moderately inflated.

Measurements.—External measurements of the type specimen and a young adult male are, respectively, as follows: Total length, 160, 147; length of tail vertebrae, 84, 81; length of hind foot, 18, 17; length of ear from notch, 10, 10. For cranial measurements see Table 1.

Comparisons.—From *Micromys minutus ussuricus* of the adjacent Korean mainland (specimens from various localities in central and southern Korea), *M. m. hertigi* differs in: Dorsal coloration, in comparable pelages, conspicuously brighter ochraceous, especially mid-dorsally; skull larger in all measurements taken (especially breadth of braincase, occipitonasal and nasal lengths, and zygomatic and interorbital breadths) except depth of braincase and length of toothrows; zygomatic notch deeper; zygomatic processes of maxillae and squamosals broader and more massive; nasals narrower and more tapering posteriorly; mesopterygoid fossa relatively narrower, pterygoids less divergent posteriorly. From *Micromys minutus pygmaeus* of central and southern China (specimens from Yochow, Hunan), *M. m. hertigi* differs in: Dorsal coloration brighter ochraceous; occipitonasal length, nasal length and zygomatic breadth greater; braincase much broader but not so deep; zygomatic notch deeper; nasals narrower; pterygoids less divergent posteriorly.

Remarks.—*M. m. hertigi* seemingly differs from all other described races of *Micromys minutus* in the Orient in generally larger cranial size, a deeper zygomatic notch, broader braincase and brighter ochraceous dorsal coloration. We have seen no specimens of *Micromys minutus aokii* of Tsushima Island or *Micromys minutus japonicus* of southern Japan. However, judging from the descriptions and measurements given by Kuroda (1922:43-44 and 1933:243-244) and measurements listed by Imaizumi (1949:264), both differ from *hertigi* in much the same manner as does *ussuricus*, that is to say, in smaller cranial dimensions and duller ochraceous dorsal pelage. Additional measurements of *M. m. pygmaeus* from South China are listed by Allen (1940:963-964).

Specimens from the Korean mainland are uniformly darker in dorsal coloration than *hertigi* save for a specimen from Songu-ri which approaches it in color. An adult male from 5 miles west of Kwangju, southwestern Korea, approaches *hertigi* in some cranial measurements.

We know of no previous report of harvest mice from Quelpart Island. The subspecies herein described is presumed to occur throughout the island in suitable habitat. Both specimens were trapped in rank grass along an improvised airstrip within sight of the East China Sea. Traps were baited with rolled oats. Patronymic recognition is accorded Dr. Marshall Hertig, Director, Commission on Hemorrhagic Fever, Armed Forces Epidemiological Board, without whose cooperation and understanding our Korean collections could not have been gathered.

Specimens examined.—Two, from the type locality (USNM 299103 and 299104).

Apodemus agrarius pallescens, new subspecies

Type.—Adult female in summer pelage, skin and skull, United States National Museum no. 299161, from 8 miles southwest of Kunsan, 10

meters, Korea; obtained 26 September 1954 by J. Knox Jones, Jr., original no. 1713.

Distribution.—Coastal areas of southern and southwestern Korea.

Diagnosis.—Upper parts drab ochraceous, sides pale ochraceous; dark dorsal stripe pale and indistinct; size, both external and cranial, relatively large.

Description.—Size: Large among subspecies of *agrarius* from the eastern Asiatic mainland, tail shorter than head and body; hind feet and ears moderately large (see measurements). Color: Upper parts (summer pelage) near Light Ochraceous-Buff, lined with black and giving an overall drab ochraceous appearance; sides somewhat paler in color; dorsal stripe indistinct; feet pale yellowish-white above, darker below; ears light brownish with anterior fringe of Ochraceous-Buff hairs; tail indistinctly bicolor, pale brownish above, lighter below; underparts grayish-white. Skull: Relatively large (see measurements), similar to *A. a. coreae*; zygomatic and interorbital regions relatively broad; zygomatic arches rather straight in jugal area as viewed from above, usually broadest across processes of squamosals; incisive foramina slightly expanded posteriorly; auditory bullae moderately inflated; rostrum somewhat shortened; interparietal bone broad; supraorbital ridges well developed; mesoterygoid fossa wide, pterygoids divergent posteriorly.

Measurements.—External and cranial measurements of the type specimen, followed by average and extreme measurements of eight other adults (five males and three females) from the type locality, are as follows: Total length, 205, 205.1 (195-217); length of tail vertebrae, 90, 90.0 (79-94); length of hind foot, 22, 22.0 (21-23); length of ear from notch, 14, 14.4 (14-15); occipitonasal length, 28.8, 27.9 (27.1-29.0); basal length, 24.5, 23.9 (23.4-25.0); zygomatic breadth, 13.7, 13.0 (12.5-13.5); interorbital breadth, 4.5, 4.5 (4.3-4.8); depth of braincase, 8.4, 8.2 (7.9-8.4); length of incisive foramina, 5.6, 5.6 (5.3-6.0); length of upper molariform toothrow, 4.1, 4.3 (4.1-4.4); length of nasals, 10.8, 10.5 (10.1-10.9).

Comparisons.—From *Apodemus agrarius coreae*, geographically adjacent to the north (specimens from various localities in central Korea), *A. a. pallescens* differs in: Dorsal coloration averaging drabber and paler, sides with less ochraceous wash; dark dorsal stripe paler and less distinct; size averaging slightly larger in both external and cranial dimensions. The skull of *pallescens* is very similar to that of *coreae*. From *Apodemus agrarius pallidior* of the Shantung Peninsula and adjacent coastal areas of North China (specimens from Tientsin, China), *A. a. pallescens* differs in: Larger in all external and most cranial dimensions; skull in general more robust; braincase deeper; dorsal color (compared with *pallidior* in winter pelage) less gray, dorsal stripe much less distinct. For comparisons with the mice of Quelpart Island, see the following account.

Remarks.—*Apodemus agrarius pallescens* is apparently the most drab-colored subspecies of the species in eastern Asia and can be distinguished from other described races on the basis of that character. A cline exists in the color of pelage of *Apodemus agrarius* from the subspecies *mantchuricus* of the forested mountainous areas of Manchuria (dark), southward to the coastal areas of the southern parts of Korea

(pale). We also note, to a lesser extent, a correlated increase in size. Thomas (1908:8) has described *coreae* from near the middle portion of this cline. The race *pallescens* here described represents the southern terminus of it.

A parallel cline, at least in color, appears to run westward from the range of *manchuricus* to culminate in the pale race, *pallidor*, of north-eastern China.

Specimens examined.—Sixty-nine, all from Korea, as follows: 8 mi. SW Kunsan, 10 meters, 28 (USNM 299143-170); 5 mi. W Kwangju, 13 meters, 16 (USNM 299171-186); Mokp'o, 100-300 feet, 4 (British Museum 6.12.6.56-59); 5 mi. ENE Pusan, 2 meters, 16 (USNM 299187-201); Pusan, 5 (USNM 298164-167, British Museum 6.12.6.55).

***Apodemus agrarius chejuensis*, new subspecies**

Type.—Adult male in summer pelage, skin and skull, United States National Museum no. 299204, from 10 miles northeast of Mosulp'o, 420 meters, Cheju Do (Quelpart Island), Korea; obtained 7 September 1954 by George W. Byers, original no. 1641 of J. Knox Jones, Jr.

Distribution.—Known only from Cheju Do, Korea.

Diagnosis.—Upper parts dark ochraceous; underparts gray tinged with buff; dark dorsal stripe distinct; size large in all external measurements taken; skull large (especially in occipitonasal, basal and nasal lengths) and relatively massive.

Description.—Size: Larger than in any named subspecies of *Apodemus agrarius*; tail relatively long, but shorter than head and body; hind feet and ears large (see measurements). Color: Upper parts (summer pelage) between Ochraceous-Buff and Raw Sienna, moderately to heavily lined with black and giving an average overall glossy, dark-ochraceous appearance; sides somewhat lighter in color; dorsal stripe distinct, black; feet grayish above (except for white hairs surrounding nails), blackish below; ears blackish-brown with anterior fringe of orange-ochraceous hairs; tail indistinctly bicolor, blackish above, lighter below. Skull: Large (see measurements); nasals long; zygomatic and inter-orbital regions massive; zygomatic processes of maxillae and squamosals large; braincase deep and relatively narrow; rostrum long, relatively narrow across nasolachrymal capsules; supraorbital ridges well developed; incisive foramina long; mesopterygoid fossa wide, pterygoids divergent posteriorly; bullae moderately inflated.

Measurements.—External and cranial measurements of the type specimen, followed by average and extreme measurements of eight other adults (seven males and one female) from the vicinity of the type locality, are as follows: Total length, 221, 223.1 (216-232); length of tail vertebrae, 104, 102.6 (96-107); length of hind foot, 23, 24.0 (23-25); length of ear from notch, 15, 15.7 (15-17); occipitonasal length, 30.2, 30.1 (29.5-30.6); basal length, 25.6, 25.5 (25.0-26.3); zygomatic breadth, 13.6, 13.7 (13.0-14.4); interorbital breadth, 4.8, 4.8 (4.6-5.1); depth of braincase, 8.8, 8.5 (8.2-9.1); length of incisive foramina, 5.7, 5.8 (5.7-6.0); length of upper molariform toothrow, 4.4, 4.4 (4.2-4.5); length of nasals, 11.7, 11.5 (11.0-11.7).

Comparisons.—From *Apodemus agrarius pallescens* of the coastal areas of southern Korea, *A. a. chejuensis* differs in: Size, both external and cranial, much larger; upper parts, feet tail and ears darker; dorsal

stripe more distinct; underparts more buffy. *A. a. chejuensis* differs in most of the same features from *A. a. pallidior* of the Shantung Peninsula and from *A. a. mantchuricus* of Manchuria and *A. a. coreae* of central Korea. The dorsal coloration approaches that of *mantchuricus* but is richer and has a more cinereous appearance.

Remarks.—*Apodemus agrarius chejuensis* is larger, both externally and cranially, than any other described subspecies of *Apodemus agrarius* and is easily distinguished from the other known races. The rich, dark coloration of *chejuensis* seems to reflect the color of the dark, reddish volcanic soils of the island where it is found.

Thomas (1907:863) and Kuroda (1934:233) have previously reported specimens from Quelpart Island but neither separated them subspecifically from the adjacent mainland population. Lack of adequate comparative material and the small numbers of specimens available to them may explain the fact that these earlier workers failed to recognize this well marked insular race.

Specimens examined.—Thirty-one, all from Cheju Do, Korea, as follows: 2 mi. SE Mosulp'o, 3 meters, 3 (USNM 299220-222); 4 mi. E Mosulp'o, 100 meters, 5 (USNM 299215-219); 6 mi. NE Mosulp'o, 200 meters, 9 (USNM 299207-214 and 299627); 10 mi. NE Mosulp'o, 420 meters, 5 (USNM 299203-206 and 299626); 6 mi. NNE Sogwi-ri, 460 meters, 2 (USNM 299223-224); no exact locality, 3000-4500 feet, 7 (British Museum 6.12.6.5-11).

LITERATURE CITED

- Allen, Glover M. 1940. The mammals of China and Mongolia. Amer. Mus. Nat. Hist., New York, 2:621-1350.
- Imaizumi, Yoshinori. 1949. The natural history of Japanese mammals. Tokyo, 348 p.
- Kuroda, Nagamichi. 1922. Notes on the mammal fauna of Tsushima and Iki islands, Japan. Jour. Mamm., 3:42-45, February 8.
- . 1933. A new form of *Micromys* from Hondo, Japan. Jour. Mamm., 14:243-244, August 17.
- . 1934. Korean mammals preserved in the collection of Marquis Yamashina. Jour. Mamm., 15:229-239, August 10.
- Ridgway, Robert. 1912. Color standards and color nomenclature. Washington, published by the author.
- Thomas, Oldfield. 1907. The Duke of Bedford's Zoological Exploration in Eastern Asia—II. List of small mammals from Korea and Quelpart. Proc. Zool. Soc. London, 1906: 858-865, April 11.
- . 1908. The Duke of Bedford's Zoological Exploration in Eastern Asia—VI. List of mammals from the Shantung Peninsula, N. China. Proc. Zool. Soc. London, 1908:5-10, July 3.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



A NEW CHIPMUNK FROM KOREA

BY DAVID H. JOHNSON¹ AND J. KNOX JONES, JR.²

Study of Korean mammals in the United States National Museum has revealed the existence of a new chipmunk of the species *Eutamias sibiricus*. This is the second contribution from a cooperative investigation currently being carried out by the U. S. National Museum, the Commission on Hemorrhagic Fever, Armed Forces Epidemiological Board, and the Army Medical Service Graduate School.

All measurements are in millimeters. Capitalized color terms are from Ridgway (Color standards and color nomenclature, Washington, 1912).

Eutamias sibiricus barberi, new subspecies

Type.—Adult female in summer pelage, skin and skull, United States National Museum no. 298042, from Central National Forest, near Pup'-yong-ni (37° 44' N, 127° 12' E), Korea; obtained 26 August 1952 by William H. Lawrence, original no. B12068.

Distribution.—Central and southern parts of Korea.

Diagnosis.—Upper parts and sides with conspicuous ochraceous tinge; rump washed with rufous; underparts of tail orange-ochraceous; skull large and distinctly rounded in lateral profile; rostrum conspicuously down-curved; upper incisors distinctly recurved.

Description.—Size medium for species (see measurements). Color (summer pelage): Crown and dark facial stripes between Ochraceous-Orange and Ochraceous-Tawny, mixed with black; cheeks near Ochraceous-Buff, finely lined with black; postauricular patch and posterior half of outer surface of ear grayish-white; nape of neck grayish; three median dark dorsal stripes black, finely lined with dark ochraceous; outermost dark dorsal stripes more suffused with dark ochraceous; inner pair of light dorsal stripes averaging between Ochraceous-Buff and Ochraceous-Orange, lighter anteriorly; outer light dorsal stripes whitish, tinged with pale ochraceous; lower sides darker, approaching Ochraceous-Buff; rump heavily washed with rufous; feet dull orange-ochraceous above, dark below; underparts whitish, hairs wholly white on chin, throat, and inner sides of legs, gray-based elsewhere; tail blackish, conspicuously frosted with white above; median ventral area of tail between Ochraceous-Buff and Ochraceous-Orange. Skull: Large and robust though relatively narrow (see measurements); dorsal outline

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distinctly rounded in lateral profile; rostrum broad and conspicuously down-curved; upper incisors distinctly recurved; cheekteeth relatively small; mesopterygoid fossa relatively narrow, its lateral margins parallel; pterygoids slightly divergent posteriorly; auditory bullae small.

Measurements.—External and cranial measurements of the type specimen, followed by average and extreme measurements of eight other adults (one male and seven females) from the type locality, are as follows: Total length, 267, 270.1 (258-285); length of tail vertebrae, 104, 118.8 (102-129); length of hind foot, 36, 37.8 (35-40); length of ear, 17, 18.3 (17-19.5); occipitonasal length, 40.5, 40.8 (39.9-42.0); basal length, 34.7, 34.3 (33.9-34.9); zygomatic breadth, 22.8, 22.0 (21.7-22.3); mastoid breadth, 16.5, 16.8 (16.5-17.3); breadth behind post-orbital processes, 11.3, 11.6 (10.8-12.3); length of nasals, 13.1, 13.3 (12.5-14.4); depth of skull, 15.4, 15.6 (15.2-15.9); length of upper molariform tooththrow, 6.6, 6.5 (6.2-6.8).

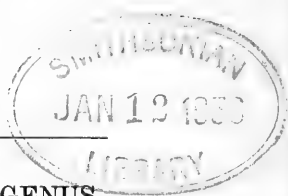
Comparisons.—From *Eutamias sibiricus orientalis*, geographically adjacent to the northeast (specimens from Nonsatong, northeastern Korea, and several localities in central and southern Manchuria), *E. s. barberi* differs in: Upper parts and sides, in general, more ochraceous, rump more rufous; dark dorsal stripes less distinct; under side of tail brighter ochraceous; skull slightly larger and more robust; its dorsal outline more rounded in lateral profile; rostrum more down-curved and averaging broader; upper incisors less procumbent; roof of skull in postorbital region broader. From the type specimen of *Eutamias sibiricus senescens* from 15 miles west of Peking, China, specimens of *E. s. barberi* differ in: Upper parts, in general, more ochraceous; dark dorsal stripes more distinct; rump decidedly more rufous; feet and under side of tail brighter ochraceous; skull narrower, especially across rostrum and zygomatic arches; nasals averaging shorter; incisors more recurved; upper molariform teeth smaller.

Remarks.—*E. s. barberi* is a well marked subspecies of *Eutamias sibiricus*. Some of the characters separating it from geographically adjacent subspecies are of the same magnitude as characters which separate full species of the same genus in western North America.

We have named this new chipmunk for Albert A. Barber, formerly with the Field Unit of the Commission on Hemorrhagic Fever, who helped to obtain many of the Korean mammals now in the U. S. National Museum.

Specimens examined.—Forty-one, all from Korea, as follows: Central National Forest, near Pup'young-ni, 21 (USNM 298040-48, 299084-87, 299582; Mus. Nat. Hist., Univ. Kansas, 60404-09; Mus. Zool., Univ. Michigan, 99587); 1 mi. N Chinbu-ri, 400 meters, 1 (USNM 298945); 4 mi. N Chip'o-ri, 150 meters, 1 (USNM 298946); Chongyang-ni, 1 (USNM 298039); Hill 1468, 3 mi. SSE Sumil-li, 4 (USNM 298947, 299082-83, 299583); Kaloguai, 55 mi. NE Seoul, 1 (British Museum, 7.6.3.23); Kimhoa, 65 mi. NE Seoul, 4 (British Museum, 7.6.3.19-22); Kuksa-bong, 1 (USNM 298049); Sangbonch'on-ni, 1 (USNM 298944); Seoul, 3 (USNM 283634, 299599-600); Songu-ri, 3 (USNM 294632, 298037-38).

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A NEW SPECIES OF FREE-TAILED BAT (GENUS
EUMOPS) FROM BRAZIL

BY CHARLES O. HANDLEY, JR.

Included in a group of bats received by the U. S. National Museum as an exchange from the Museu Paulista, São Paulo, Brazil, in 1904, is a specimen apparently distinct from named species. It may be recognized by the following description:

Eumops amazonicus sp. nov.

Holotype.—U.S.N.M. no. 123827; young adult, skin and skull (digital epiphyses ossified and teeth slightly worn); collected in 1899, by "Bicego"; Manáos, Amazonas, Brazil; Museu Paulista number 365a.

Distribution.—Known only from the type locality.

Description.—Tooth formula, $1/2-1/1-2/2-3/3 = 30$. Upper incisors in contact with one another at base but tips divergent, one millimeter apart; cingula of incisor and canine separated by 0.25 mm. space; upper canine small, both in height and in diameter at cingulum; P^1 in tooththrow, not crowded, touching canine but not touching P^4 ; P^4 relatively small and compact, outline at cingulum not showing bulges of cusp bases; M^3 with third commissure almost as long as second and metacone almost as high as mesostyle. Mandibular tooththrow not excessively crowded; incisors arranged in semicircle, only slightly imbricated; talonid of M_3 with two prominent cusps. Mesopterygoid fossa broad anteriorly, narrowing posteriorly; basisphenoid pits large, deep, and well defined, considerably exceeding mandibular fossae in area; palate extending posteriorly about one millimeter beyond level of rear edges of third molars; brain case shallow; rostrum narrow; lachrymal ridges and sagittal and lambdoidal crests only slightly developed.

Lips apparently without wrinkles; tragus small, with rounded tip; auricle probably extending beyond tip of snout when laid forward; keel of auricle, 11.6 mm.; connecting membrane on forehead seemingly about 3 mm. high. Connecting membrane and inner edge of keel, anterior base of forearm, and membrane posterointernal to wrist, hairy. Other parts of auricle, face, and membranes essentially naked.

Dorsum rich blackish brown, considerably more blackish than Carob Brown; bases of hairs like tips on lower back, paler than tips on nape and upper back; hairs of underparts tricolor, whitish at base and tip, brownish medially, mass effect about Verona Brown (capitalized color terms from Ridgway, *Color standards and color nomenclature*, 1912).

Measurements (in millimeters).—Greatest length (not including incisors) 17.3, basal length 14.9, zygomatic breadth $10.6 \pm$, interorbital breadth 4.0, mastoidal breadth 9.8, depth of brain case (not including auditory bullae) 5.9, maxillary tooththrow 6.7, palatal breadth (between

outer margins of M^3) 7.4, post-palatal length (posterior margin of palate to anteroventral lip of foramen magnum) 7.7, breadth of mesopterygoid fossa 2.5, forearm 36, tibia 11.5.

Comparisons.—*Eumops amazonicus* agrees in all details with Miller's diagnosis of the genus *Eumops* (Bull. U. S. Nat. Mus., 57:257, 1907). For diagnoses of other species of this genus, see: Sanborn, Jour. Mamm., 13(4):347, 1932; Goodwin, American Mus. Novit., 1075:2, 1940; Benson, Proc. Biol. Soc. Washington, 60::133, 1947; Hall & Villa, Univ. Kansas Publ. Mus. Nat. Hist., 1(22):445, 1949.

Eumops amazonicus is most like *E. hansae* Sanborn, but is considerably smaller (greatest length of skull 17.3 mm. as opposed to 20.7 mm.; forearm 36 mm. in contrast to 41.5 mm.). Characters of the upper incisors, canine, P^4 , M^3 , palate, and basisphenoid pits are similar in the two species, and they agree in having the forearm relatively shorter than any other species of the genus. The forearm is about twice the greatest length of the skull in *amazonicus* and *hansae*, about two and one-half times the greatest length in other species.

Eumops amazonicus resembles *E. bonariensis* (specimens from Asuncion and Villa Rica, Paraguay) in size, but differs from it in many dental and cranial details. *E. bonariensis* has the upper incisors with less divergent tips; the upper canine larger, almost touching I^1 and P^4 and forcing P^1 out of toothrow; P^4 wider and the bases of the cusps bulging at the cingulum; the third commissure of M^3 shorter than the second commissure; the lower incisors more crowded; the posterior border of the palate about at the level of the posterior edge of M^3 ; the mesopterygoid fossa narrow anteriorly and broadening posteriorly; the basisphenoid pits small, shallow, and somewhat ill-defined, equaled or surpassed in area by the mandibular fossae; the lachrymal, sagittal, and lambdoidal crests better developed; and the brain case deeper (its depth equal to 43-44 per cent of the basal length in *E. bonariensis*, 40 per cent in *E. amazonicus*).

Specimen examined.—The holotype.

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FOUR NEW AMERICAN CHILOPODS

RALPH V. CHAMBERLIN

The following species of chilopods are herewith described as new.

Scolopendridae

Scolopendra malkini new species

Color light testaceous brown.

Head without sulci. smooth and non-punctate. Antennae composed of 30-31 articles.

First tergite with a deep cervical sulcus but with no longitudinal sulci. The other tergites from the second to the penult bisulcate. Last tergite with no median sulcus, its caudal margin conspicuously convex or arcuate.

Prehensors with plate smooth and without a transverse sulcus; prosternal teeth 4 + 4, the two innermost on each side fused except at tips.

Last coxae each with a conical process which bears six spinules; caudal margin of coxa ectad of the process also with a spinule.

Prefemur of anal legs with a short, distally rounded, process at inner distal corner, bearing above 4-6 spinules; numerous spinules on mesal and ventral surface, these forming 5-6 longitudinal series with 5-7 spinules in each series; the other joints without spinules.

Legs one to twenty with a tarsal spine.

Length, 45 mm.

Locality.—Mexico: Sonora, Estero de Sargente, 25 mm. south of Desemboque. One specimen taken August 12, 1953 by Borys Malkin (#95).

Structurally this species is near to *S. pachygnatha* Pocock, which was described from Zacatecas. It differs in the more numerous articles of the antennae and in having a well developed conical caudal process on the last coxae as well as in the spining of the anal legs.

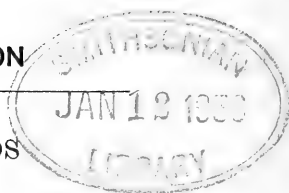
Chilenophilidae

Cheiletha phoenix new species

Sides of head parallel over middle portion of length, curving at ends to the straight posterior and anterior margins. Head longer than wide in the ratio 7:5. No frontal suture evident.

Basal plate trapeziform, about as wide posteriorly as the greatest width of the head. Prehensors much exposed from above, the claws when closed surpassing the end of the first antennal article; claw with a conical tooth at base and a blunt tooth present at distal end of femur; prosternum with two rounded tubercles on anterior margin, these small; no sclerotic lines on prosternum.

One clypeal spot which is distinctly areolate. Lateral pieces of labrum meeting in front of the middle piece as usual. First maxillae with two pairs of long sensory lappets.



Dorsal plates bisulcate and punctate. Sternites with a median sulcus; strongly punctate, the punctae subdensely arranged. Ventral pores not detected.

Spiracles all circular, the first decidedly larger than the second.

Last ventral plate moderately wide, its sides straight and converging caudad. Coxal pores about nine on each side, arranged in a subelletic line along margin of sternite and middle of coxal surface.

Anal pores present.

Pairs of legs in the female holotype, 57.

Length, about 26 mm.

Locality.—Arizona: Phoenix, South Mts. One female taken April 10, 1953.

This species differs from *C. alaska*, the generotype, in having the teeth of the labrum much stouter, the fewer coxal pores and their arrangement.

Cheiletha kincaidi new species

General color yellow, with head and prehensors chestnut.

Basal plate overlapped by the cephalic, about as wide posteriorly as the head where widest. Prehensors much exposed from above as in the other known species, the claws when closed surpassing the distal end of the first antennal article. Anterior margin of the prosternum unarmed; a small tooth at distal end of femuroid and one at base of claw, the intermediate joints each with each with a minute or abortive denticle.

The lappets of the first maxillae two on each side, these especially long and conspicuous. Coxae of the second maxillae connected at the middle only by a narrow, finely areolate isthmus.

Dorsal plates bisulcae, smooth.

All spiracles circular, the first much larger than the second.

A few of the most anterior sternites angularly produced behind, the angle more or less overlapped by the succeeding plate.

Last ventral plate long and narrow, narrowing caudad. Coxal pores about twelve, one more isolated in caudal position, the others chiefly along sternite and tergite, leaving the median part of the surface usually free of pores.

Anal pores present.

Pairs of legs, 47-49.

Length, 25-27 mm.

Locality.—Washington: Ocean Park. Three specimens taken July 22, 1954, by Professor Trevor Kincaid, for whom the species is named.

Ethopolidae

Ethopolys bipunctatus insulatus new subspecies

Body showing very little pigment, faintly yellowish.

Ocelli unpigmented; 1—4, 3, 3, with the single ocellus large, the others very small. Antennae long, composed of twenty long, slender articles.

Prosternal teeth very small, 3-6 + 6-3, the outer three separated from the others by a diastema, the innermost tooth of the outer three minute and the innermost tooth of the inner group also minute and located down the margin of the median sinus.

Anal legs long and unmodified in the male; ventral spines 1, 1, 3, 1, 1,

the dorsal spines 1, 0, 2, 1, 0 with the claw armed with an accessory claw. Penult legs with ventral spines 1, 0, 2, 2, 2;; the dorsal spines 1, 0, 2, 1, 1; an accessory claw present.

Dorsal plates rugose, none with posterior angles produced.

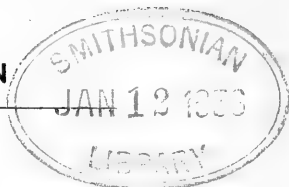
Coxal pores small and multiseriate in the usual manner.

Length, about 11 mm.

Locality.—Utah: Stansbury Island, in "Spider Cave." One male taken November 8, 1952.

In the proportionately great length of antennae agreeing with *E. bipunctatus* but a much smaller species which also differs, e.g., in having three teeth ectad of the diastema in the prosternal series instead of two, etc. It is, however, of not more than subspecific rank.

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TWO NEW JERBOAS FROM EGYPT

By HENRY W. SETZER

United States National Museum

Collections of mammals from Egypt are being studied to determine the taxonomic status and geographic distribution of the various species within the confines of that country. As a result of this study, two subspecies of jerboas are found to differ from previously named kinds.

The specimens on which the following descriptions are based have been made available for study by the U. S. Naval Medical Research Unit No. 3 of Cairo, and by the authorities of the Chicago Natural History Museum. All measurements are in millimeters and the capitalized color terms are from Ridgway's *Color Standards and Color Nomenclature*.

Jaculus jaculus elbaensis subsp. nov.

Type.—Chicago Natural History Museum, number 82295, adult male, skin and skull, from Wadi Darawena, (36° 22' E, 22° 11' N) Jebel Elba, Sudan Government Administrative Area, Egypt. Obtained 9 March 1954 by Makram Kaiser, original number 10084 of Harry Hoogstraal.

Specimens examined.—Fifteen, from: *Sudan Government Administrative Area*, Bir Sarrara, 1; Wadi Darawena, Jebel Elba, 1; 3 mi. N Jebel Elba, 1; 2½ mi. N Jebel Elba, 5; *Eastern Desert Governorate*, Bir Abraç, 6; Wadi Na'am, 1.

Diagnosis.—General overall dorsal coloration Clay Color. Individual hairs plumbeous at base, banded with Cinnamon-Buff, and finely tipped with black. Entire underparts, hip stripe, dorsal surfaces of hands and feet, and tip of tail pure white. Length of tail, hind foot and ear about normal for the species. Skull with auditory bullae markedly inflated posteriorly. Top of skull not domed; rostrum wide; zygomatic arches rather massive; upper incisors broad and anteroposteriorly thickened; palate broad.

Measurements of the type specimen.—Total length 276; length of tail 178; length of hind foot 63; length of ear 22; greatest length of skull 33.0; condyloincisive length 28.2; crown length of upper molariform tooththrow 4.6; greatest breadth across anterior zygomatic processes 23.3; least interorbital breadth 11.8; median length of nasals 12.2; breadth of rostrum at level of antorbital foramen 4.9; greatest breadth of braincase 23.1.

Comparisons.—From *Jaculus jaculus butleri*, which is the subspecies closest geographically, *J. j. elbaensis* differs in brighter color in comparable pelages, larger size, markedly larger skull in all respects, particularly a greater posterior inflation of the auditory bullae, shorter

space between the hard palate and the ventral anterior inflation of the auditory bullae, markedly larger upper incisors, wider rostrum, and somewhat larger upper molars.

From *Jaculus jaculus jaculus*, as known from Giza Province, *Jaculus jaculus elbaensis* differs in somewhat darker color, (with more admixture of red). The skull of *elbaensis* is larger, the auditory bullae more inflated posteriorly, the anterior palatine foramina larger, the upper incisors larger, the upper molars larger, and the space between the hard palate and the ventral anterior inflation of the auditory bullae shorter.

Remarks.—The specimen from Wadi Na'am shows intergradation in color between *J. j. jaculus* and *J. j. elbaensis*. In addition, the cranium of this specimen also shows characters which can be interpreted as intergradation in the degree of inflation of the auditory bullae, the distance between the hard palate and the ventral anterior inflation of the auditory bullae, and in the degree of doming of the skull. In the majority of the characters studied this specimen seems nearer to *J. j. elbaensis* and is so referred.

No intergradation can be demonstrated, as yet, between *J. j. butleri* and *J. j. elbaensis*.

***Jaculus jaculus favillus* subsp. nov.**

Type.—Chicago Natural History Museum, no. 75708, adult female, skin and skull, from Bir Bosslanga, Salum, Western Desert Governorate, Egypt. Obtained 25 October 1953 by Harry Hoogstraal, original number 9718.

Specimens examined.—Five, from: *Western Desert Governorate*, Bir Bosslanga, 1; Mersa Matruh, 1, Sidi Barrani, 3.

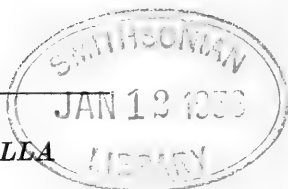
Diagnosis.—Upper parts, in general overall color, near Buckthorn Brown, hairs banded with pure color near Tawny Olive. All hairs plumbeous at base and rather broadly tipped with black. Hind foot relatively long and broad. Skull large; auditory bullae markedly inflated both ventrally and posteriorly; rostrum broad; dorsal surface of skull rather more arched than usual.

Measurements of the type specimen.—Total length 296; length of tail 181; length of hind foot 64; length of ear 26; greatest length of skull 34.0; condyloincisive length 29.9; greatest breadth across anterior zygomatic processes 23.0; least interorbital breadth 12.6; median length of nasals 11.8; breadth of rostrum at level of antorbital foramen 5.0; greatest breadth of braincase 23.5.

Comparisons.—*Jaculus jaculus favillus* may be distinguished from *J. j. jaculus*, as known from Abu Ghâlib, Giza Province, by its darker color, longer hind foot and longer ear. The skulls of *favillus* may be differentiated by markedly larger size, more pronounced inflation of the auditory bullae, wider rostrum, and generally longer anterior palatine foramina.

Remarks.—This subspecies apparently represents an eastward extension of the Libyan fauna into extreme western Egypt where the influence of the more humid sections of the Mediterranean littoral is exerted on numerous other kinds of animals and plants, many of which are stopped in their eastward range by the harsh conditions existing in the Egyptian deserts.

PROCEEDINGS
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STATUS OF THE GENERIC NAME *ZORILLA*
(MAMMALIA): NOMENCLATURE
BY RULE OR BY CAPRICE

BY PHILIP HERSHKOVITZ

Chicago Natural History Museum

An article by Ellerman and Morrison-Scott (1954) entitled "*Ictonyx* Kaup, 1835, the correct generic name, and *Ictonyx striatus* (Perry), 1810, the correct specific name for the African Stinkmuishond," brings to the fore three fundamental issues, as follows.

I. Shall a generic name be applied to some one of the animals originally described under that name, or may it be restricted to an animal alien to the original description of the genus?

II. Shall the type of a genus be one of the species included in the original definition of that genus, or may it be some other species selected by a future reviser?

III. Shall a post-Linnaean taxonomic work that has been printed, distributed and consistently cited in scientific publications for its valid binomials be duly recognized, or may it be suppressed in part or in whole according to the dictates of convenience or prejudice?

The first question refers to the status of the generic name *Zorilla*. Hershkovitz (1953: 378-379) deemed it relevant to present a full transcription of the original description of the genus *Zorilla* I. Geoffroy as documentary evidence for the pertinence of that name to African polecats. Ellerman and Morrison-Scott (1953, 1954) have made it evident, on the other hand, that they regard the text of the description of *Zorilla* as irrelevant because they make no allusions to it in their attempt to justify application of the name to American polecats currently and correctly referred to the genus *Spilogale* Gray. To facilitate examination of the problem, a literal translation of the description of *Zorilla* I. Geoffroy (1826:215) is given herewith.

"The zorillas, *Zorilla*. They agree with polecats in their dental formula; in their long powerful claws they are similar to skunks. They also resemble skunks in coloration. Because of the modification of their claws zorillas cannot climb trees as do [some] other mustelids. However, like skunks, they dig well and make burrows. Not more than one species [italics mine] of this subgenus has been recognized.

"Le Zorille, Buff. T. XIII, pl. 41; *Mustela Zorilla* et *Viverra Zorilla* of systematists, is more than a foot long from the tip of its snout to the base of its tail which is about eight inches long. It is usually black with several white spots on the head and several longi-

tudinal stripes of the same color on the upper part of the body. The stripes and spots are rather constant in pattern but their proportional size varies considerably. The species is not restricted to the Cape of Good Hope; it occurs, also in Senegal and along the shores of the Gambia River where it was found by the ill-fated voyager, Bodwich [sic = Thomas Edward Bowdich, 1791-1824]. The zorilla of Senegal and the Gambia differs in several respects from the one of the Cape. While the same pattern of spots and stripes obtains in both, in the first the white is much more extensive than the black with the result that the pelage is nearly entirely white on the upper parts and the sides of the body. In the Cape variety, the reverse appears to be true. Nevertheless, we do not believe that the two animals should be regarded as each representing a distinct species because the extension of the white varies so much among individuals of any one locality that it is difficult to find two specimens exactly alike."

The above translation supplies the answer to the question of what kind of animals the genus *Zorilla* is based on and the place of origin of those animals. The second question is, shall the type of *Zorilla* be the species of African polecats described in the original definition of the genus or shall it be an exotic American polecat of the genus *Spilogale*? Actually, there is no alternative, because not only is the African species described but it is particularly stated by I. Geoffroy that only the African species is included in the genus *Zorilla*.

Ellerman and Morrison-Scott, on the other hand, follow a peculiar course in their attempt to determine the genotype. They (1954:130) first quote with approval the statement that, "the type species of *Zorilla* I. Geoffroy, 1826, is, as Hershkovitz (Proc. Biol. Soc. Washington, 62:14, 1949) points out, 'Le Zorille, Buff. T. XIII, pl. 41; *Mustela Zorilla* et *Viverra Zorilla* des auteurs systématiques'." They go on, however, to declare, "since the only bibliographic reference is to Buffon, the identity of *Zorilla* I. Geoffroy must clearly be that of Buffon's plate." This obviously is not the case.

The generic name *Zorilla* is not based on a description of Buffon's *zorille* or on a reference to it. The name is based clearly, unequivocally and *exclusively* on a description of specimens of African polecats placed before the author, I. Geoffroy. Indeed, the original definition of *Zorilla* remains to this day the best taxonomic treatment of these animals. Inclusion of a bibliographic reference to Buffon's *zorille* in the indicated genotype rests solely on Geoffroy's assumption that the animal is the same as the "*Mustela Zorilla* et *Viverra Zorilla* des auteurs systématiques." Buffon's *zorille* cannot stand alone as genotype on the premise, apparently adopted by Ellerman and Morrison-Scott, that the whole is equal to any of its parts. The charge of "selection," cancellation and substitution of type species, directed by Ellerman and Morrison-Scott (1954:130) against me, actually applies to action taken by those authors.

In this connection, Article 30 Ic of the International Rules of Zoological Nomenclature states, "a genus proposed with a single original species takes that species as its type. (Monotypical genera)." The only species in the original description of *Zorilla* is an African polecat. There can be no "selection." Unfortunately, the name indicated by I. Geoffroy for the species described is composite and ambiguous for

nomenclatural purposes. It consists of three distinct but synonymous elements, namely "Le *Zorille* Buff, T. XIII, pl. 41," and "*Mustela Zorilla*," and "*Viverra Zorilla*." In this case, Article 30 Id of the Code is decisive in resolving the nomenclatural difficulty. It declares that "if a genus, without originally designated or indicated type, contains among its original species one possessing the generic name as its specific or subspecific name, either as valid name or synonym, that species or subspecies becomes *ipso facto* type of the genus. (Type by absolute tautonomy)."

Mustela zorilla, by virtue of possessing both generic and subgeneric names as the components of its specific name is indisputably that part of the original genotypic designation that becomes "*ipso facto*" the name of the genotype. It had been shown by me (1953:379) that *Mustela zorilla* I. Geoffroy, 1826, is the same as *Mustela zorilla* E. Geoffroy, 1803. It appears now that the combination *Mustela zorilla* had already been proposed by G. Cuvier in 1798 (Tabl. Élém. Hist. Nat., p. 116) for polecats of the Cape of Good Hope.

It seems that Ellerman and Morrison-Scott missed the point entirely regarding my earlier (1949) use of *Viverra mapurita* Müller, 1776, as the name for the genotype of *Zorilla* I. Geoffroy. This binomial was the first applied strictly to Buffon's *zorille* and cannot be used for anything else. If Buffon's *zorille* is identifiable as an African polecat, Müller's technical name is the earliest for the animal later described by G. Cuvier, E. Geoffroy and I. Geoffroy. Hence *Mustela zorilla* of authors would become *Zorilla mapurita* (Müller) merely by synonymy. The name may change but the genotype does not. If Buffon's *zorille* is not identifiable as an African polecat, Müller's name for it is not available for any African animal described by Geoffroy or by anyone else. Finally, if Buffon's *zorille* is, as Ellerman and Morrison-Scott would have it, an American spotted skunk of the genus *Spilogale*, the name *Viverra mapurita* automatically becomes *Spilogale mapurita* (Müller). Such identification of Buffon's *zorille* would cancel my use of Müller's name for the genotype of *Zorilla* because, according to Article 30 IIa of the Code, an American animal is a species "not included under the generic name at the time of its original publication." To avoid the confusion and controversy entailed by Ellerman and Morrison-Scott's cancellation, I finally proposed (1953:381) that Buffon's *zorille* be considered "not certainly identifiable." Disposition of Buffon's *zorille* made by me, by Ellerman and Morrison-Scott, by I. Geoffroy, or by anyone else, remains on a species level. The status of *Zorilla* as the correct generic name for the species of African polecats described by I. Geoffroy is not in the least affected.

The third question regarding the status of the work cited as a legitimate publication by one author and not recognized by another, was planted by Ellerman and Morrison-Scott (1954:130) in the following manner, "*Mustela zorilla* 'E. Geoffroy, 1803' is unavailable since the Cat. Mamm. Mus. Nat. Hist. was never published. This is made quite clear by I. Geoffroy, 1839, Magasin de Zoologie (2) 1, page 5 of the text dealing with mammal plates 1-4, and the work was rejected by Sherborn. Setzer, 1952, Proc. U. S. Nat. Mus., 102: 343, thought that I. Geoffroy said that his father's work *had* been published. But it

transpires (*in. litt.*) that Setzer was relying on a faulty rendering of the French text."

In the above indictment, Ellerman and Morrison-Scott include no analysis of the censured work in the light of any definition, official or otherwise, of what constitutes publication. Their conclusion appears to be based entirely on a misinterpretation of Setzer's published opinion, on a purported change of heart expressed in private correspondence, on an undocumented reference to Sherborn, on an incomplete bibliographic reference to statements made by I. Geoffroy, none of which are quoted. Last, but not least, Ellerman and Morrison-Scott give no indication that they have even examined the work they condemned.

What Setzer (1952:102) said in the place cited by Ellerman and Morrison-Scott, is "The 'Catalogue des Mammifères du Museum National d'Histoire Naturelle' meets all requirements for Linnaean names as established by the International Commission on Zoological Nomenclature. In all instances the descriptions are clearly recognizable. It is believed that the statement of Isidore Geoffroy St.-Hilaire, to the effect that his father never intended the above work for a scientific treatise, should not be accepted, inasmuch as the work is clear, concise, and was published and circulated." I see no reason for altering these statements and I subscribe to them without reservation.

What I. Geoffroy said about the "Catalogue des Mammifères . . ." is variously recorded in three distinct accounts. In the first, the one referred to by Ellerman and Morrison-Scott, I. Geoffroy (1839:5 and footnote 2) notes that (translated literally), "this work, written about 1800 and cited in all mammalogical works, remained unpublished ['*inédit*']". Its printing was well advanced when a protracted illness obliged my father to leave to a person little versed in zoology, the task of completing the work. Upon his recovery, my father recognized that several serious errors had been committed and he renounced the publication of the book. Nevertheless copies [printed] were given away successively to various naturalists [who] by means of their citations [gave] very wide . . . publicity to a work which its author had condemned to oblivion." In the biography of his father I. Geoffroy (1847: 118) explains that it was one of the elder Geoffroy's students who was "entrusted with the task of reading proof." He added that the edition of the "Catalogue . . ." was saved from destruction by its own author because colleagues, notably Cuvier, intervened and thus "the first extended work written by Geoffroy Saint-Hilaire became a part of the science [of mammalogy]." In an appendix to the biography, I. Geoffroy places (p. 241) his father's "Catalogue . . ." at the head of the list of works published by him ["*publiés par lui*"] and adds the descriptive note "Volume in-8°." Finally, in 1851 (Cat. Meth. Coll. Mamm., p. v) I. Geoffroy gives an altered version by stating that his "father wrote part of the 'Catalogue . . .' before his journey to Egypt and part of it on his return. He adds that the "volume in-8°" was printed ["*imprimé*"] in 1803 and (*loc. cit.* footnote 2) "distributed both in France and abroad and is cited in all treatises on mammalogy."

It is evident from the text of the above accounts that I. Geoffroy used the term unpublished ["*inédit*"] subjectively in attempting to transmit the wish of his father that the "Catalogue . . ." was dis-

avowed by its author. He then applies the term published ["publié"] objectively when referring to the physical state of the work itself.

Publication and circulation are the requirements for making available properly constituted scientific names proposed in a work by a binomialist. The copy of E. Geoffroy's "Catalogue . . ." consulted by me is housed in the library of the U. S. Department of the Interior. It is not a manuscript or a collection of proof sheets or tear sheets. It is a volume in 8vo with its pages numbered consecutively from 1 to 272. It is printed with the same style type and on the same quality of paper as were other official publications of the Paris Museum at that time. According to Article 25 of the Code, the names in E. Geoffroy's "Catalogue . . ." are valid and according to Article 32, "a generic or a specific name, once published, cannot be rejected, even by its author. . . ." Thus the disavowal of the "Catalogue . . ." by the author, the apologies made by his son, and the protestations raised by Ellerman and Morrison-Scott, are of no avail. Indeed, it appears that these authors regard the "Catalogue . . ." as "unpublished" only on certain occasions. In their "Checklist of Palaearctic and Indian Mammals, 1758 to 1946" Ellerman and Morrison-Scott (1951:581) are of a different humor and list as valid, *Rattus rattus alexandrinus* Geoffroy, 1803, with the citation "1803 *Mus alexandrinus* Geoffroy, Cat. Mamm. H. N. Paris 192. Alexandria, Egypt."

I add a final example on the same subject that bears directly upon the question of whether stability in scientific nomenclature is attained through International Rules or through individual caprice. In another publication, entitled "Southern African Mammals 1758 to 1951: A reclassification," Ellerman and Morrison-Scott, with R. W. Hayman (1953:111) list *Rhabdogale* Wiegmann as a synonym of *Ictonyx* (= *Zorilla*) and "select" *Bradypus striatus* Perry as type species. According to the Code, this action is invalid and void. The original genotype of *Rhabdogale* is "Die Zorillen Afrika's." This leaves nothing for selection. First reviser of the genus *Rhabdogale* is Wagner (1841:219, fig. 133A). He described and figured the monotype "*Rh. mustelina* Wagn." new name for *Mustela zorilla* of authors (Cuvier, Desmarest, I. Geoffroy and Smuts). This subsequent designation (definitely not a "selection") of a name for the genotype of *Rhabdogale* is not subject to change. (cf. Article 30 II f and g of the Rules of Zoological Nomenclature).

The case for *Zorilla* I. Geoffroy, 1826, as generic name for African polecats typified by *Mustela zorilla* G. Cuvier 1798, is so clear as in no way to call for special action by the International Commission on Zoological Nomenclature.

The genus and only included species stands as follows.

Genus *Zorilla* I. Geoffroy

Zorilla I. Geoffroy, 1826, Diet. Class. Hist. Nat., Paris, 10:215—subgenus of *Mustela*; genotype by monotypy, *Mustela zorilla* I. Geoffroy = *Mustela zorilla* G. Cuvier; G. Cuvier, 1829, Diet. Sci. Nat., Paris, 59:499—full genus; Gray, 1869, Catalogue of carnivorous, pachydermatous, and edentate Mammalia, British Mus. (Nat. Hist.), p. 139—part; Trouessart, 1897, Cat. Mamm., p. 258—part; Hersh-

- kovitz, 1949, *Journ. Mamm.*, 30:295—generic name valid for African polecats.
- Ictonyx* Kaup, 1835, *Das Thierreich*, 1:352—genotype by monotypy, *Ictonyx capensis* Kaup = *Zorilla zorilla zorilla* G. Cuvier. Howell, *Proc. Biol. Soc. Washington*, 19:46—"Zorilla" Oken not valid, replaced by *Ictonyx* Kaup; Ellerman, Morrison-Scott, Hayman, 1953, *Southern African mammals 1758 to 1951: A reclassification*, *British Mus. (Nat. Hist.)*, p. 111—classification, synonymy, distribution.
- Rhabdogale* Weigmann, 1838, *Arch. Naturg.*, Jahrg. 4, 1:287, footnote 9—genotype, "die Zorillen Afrika's;" Wagner, 1841, *Schreber's Säugthiere*, supply. 2:217—designated genotype, *Rhabdogale mustelina* Wagner = *Zorilla zorilla zorilla* G. Cuvier.

Zorilla zorilla zorilla G. Cuvier

- Mustela zorilla* G. Cuvier, 1798, *Tabl. Élém. Nat. Hist.*, p. 116—original description of "le zorille, ou putois du Cap."
- Bradypus striatus* Perry, 1810, *Arcana*, or *The Museum of Natural History*, pt. 2, zoology, text and pl. 41—"exhibited alive in London . . . and is reported to have been found in South America;" Hollister, 1915, *Proc. Biol. Soc. Washington*, 28:184—type locality, of *Bradypus striatus* Perry designated Cape of Good Hope.
- Ictonyx striatus striatus* G. M. Allen, 1939, *Bull. Mus. Comp. Zool.*, 88:179—synonyms: *striatus* Perry, *capensis* Smith, *capensis* J. B. Fischer, *africana* Lichtenstein, *mustelina* Wagner, *variegata* Lesson *zorilla* Trouessart; Ellerman, Morrison-Scott, Hayman, 1953, *Southern African mammals 1758 to 1951: A reclassification*, *British Mus. (Nat. Hist.)*, p. 112—synonyms: *striatus* Perry, *capensis* Smith, *zorilla* Smuts, *africana* Lichtenstein, *mustelina* Wagner, *pondoensis* Roberts.

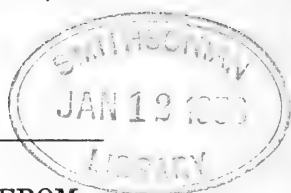
Currently recognized subspecies of *Zorilla zorilla* are: *Z. z. limpoensis* Roberts, *Z. z. maximus* Roberts, *Z. z. orangiae* Roberts, *Z. z. pretoriae* Roberts, *Z. z. arenarius* Roberts, *Z. z. ghansiensis* Roberts, *Z. z. shortridgei* Roberts, *Z. z. lancasteri* Roberts, *Z. z. kalaharicus* Roberts, *Z. z. giganteus* Roberts, *Z. z. ovamboensis* Roberts, *Z. z. albescens* Heller, *Z. z. elgonis* Granvik, *Z. z. erythrae* De Winton, *Z. z. intermedius* Anderson and De Winton, *Z. z. obscuratus* de Beaux, *Z. z. senegalensis* J. B. Fischer (includes *Mustela zorilla* E. Geoffroy, 1803), *Z. z. shoae* Thomas, *Z. z. sudanicus* Thomas and Hinton.

Literature Cited

- Buffon, George Louis Leclerc, Comte de
1765 *Histoire naturelle, générale et particulière avec la description du cabinet du Roi* 13:289, 295-298, 302-303, pl. 41.
- Ellerman, J. R. and T. C. S. Morrison-Scott
1951 *Checklist of Palaearctic and Indian mammals 1758 to 1946*. British Museum (Natural History), 810 pp.
1953—The technical name of the African muishond (genus *Ictonyx*). *Journ. Mammal.*, 34:114-116, pl. 1.
1954 *Ictonyx* Kaup, 1835, the correct generic name, and *Ictonyx striatus* (Perry), 1810, the correct specific name for the African stinkmuishond. *Journ. Mammal.* 35:130-131.

- Ellerman, J. R., T. C. S. Morrison-Sottt, and R. W. Hayman.
 1953. Southern African mammals 1758 to 1951: A reclassification. British Museum (Natural History), 363 pp.
- Geoffroy, Saint Hilaire, Étienne
 1803 Catalogue des mammifères du Museum National d'Histoire Naturelle. Paris. 272 pp.
- Geoffroy, Saint-Hilaire, Isidore
 1826 [Article] Marte, *Mustela*. Dict. class. d'hist. nat., Paris, 10:207-216.
 1839 Mammifères, Pl. 1 à 4. Mag. Zool. (Guérin-Méneville), (2) 1:1-37, pls. 1-4.
 1847 Vie, travaux et doctrine scientifique d'Étienne Geoffroy Saint-Hilaire. Paris, P. Bertrand. 3 + 1 + 479 pp.
 1851 Catalogue méthodique de la collection des mammifères, de la collection des oiseaux et des collections annexes. Mus. Hist. Nat., Paris, vii + 96 pp.
- Herskovitz, Philip
 1949 Technical names of the African muishond (genus *Zorilla*) and the Colombian hog-nosed skunk (genus *Conepatus*). Proc. Biol. Soc. Washington, 62:13-16.
 1953 *Zorilla* I. Geoffroy and *Spilogale* Gray, generic names for the African and American polecats, respectively. Journ. Mammal., 34:378-382.
- Setzer, Henry W.
 1952 Notes on mammals from the Nile Delta region of Egypt. Proc. U. S. Nat. Mus., 102:343-369.
- Wagner, Johann Andreas
 1841 Schreber's Die Säugethiere in Abbildungen nach der Natur mit Beschreibungen. Supplementband 2: viii + 558.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



A NEW REED VOLE, GENUS *MICROTUS*, FROM
CENTRAL KOREA

BY J. KNOX JONES, JR.¹ AND DAVID H. JOHNSON²

The study of a collection of mammals from Korea has revealed the existence in the central part of that peninsula of an undescribed vole of the species *Microtus fortis*. This study is being carried out at the United States National Museum in cooperation with the Commission on Hemorrhagic Fever of the Armed Forces Epidemiological Board and the Army Medical Service Graduate School.

All measurements are in millimeters. Capitalized color terms are from Ridgway (Color standards and color nomenclature, Washington, D. C., 1912).

Microtus fortis uliginosus, new subspecies

Type.—Adult female in summer pelage, skin and skull, United States National Museum no. 298078, from Chip'o-ri (38° 08' N, 127° 19' E), Korea; obtained 28 August 1952 by William H. Lawrence, original no. B-12098.

Distribution.—Known only from a restricted area in central Korea bounded by Kumhwa and Ch'orwon on the north and the 38th Parallel of latitude on the south.

Diagnosis.—Size large; upper parts glossy, Olive Brown; skull large and massive; auditory bullae and cheekteeth large.

Description.—Size large for species (see measurements). Color: Upper parts (summer pelage) glossy and averaging overall near Olive Brown (individual hairs entirely blackish or banded subterminally with near Ochraceous-Buff); sides more suffused with ochraceous than back; underparts grayish-white, usually faintly tinged with buff; ears dark brownish; feet brownish above, paler on inner sides (over metatarsals of first and second digits) and below; tail distinctly bicolor, blackish-brown above, grayish-white below. Skull: Large and massive (see measurements); nasals expanded anteriorly; infraorbital canals narrow when viewed from the front; zygomatic arches distinctly bowed, though rather straight in jugal region, and relatively massive; skull deepest over anterior parts of orbits; auditory bullae and cheekteeth large.

Measurements.—External measurements of the type specimen, followed by average and extreme external measurements of four other adult females from the type locality, are, respectively: Total length,

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211, 206.0 (197-215); length of tail vertebrae, 62, 57.7 (55-61); length of hind foot, 24, 24.2 (21-27); length of ear from notch, 15, 15.5 (14-17). Average and extreme external measurements of five adult males from the type locality are as follows: Total length, 207.8 (193-223); length of tail vertebrae, 64.2 (57-70); length of hind foot, 24.4 (23-26); length of ear from notch, 16.4 (15-18). For cranial measurements see Table 1.

Comparisons.—From *Microtus fortis pelliceus* of Manchuria and southeastern Siberia (specimens from Sungari River, 60 miles southwest of Kirin, Manchuria, and the type specimen which was examined by Johnson at the British Museum but is not at hand as we write), *M. f. uliginosus* differs in: Upper parts, in general, more suffused with ochraceous and having a slightly lighter and somewhat more olivaceous appearance; winter pelage shorter and seemingly less dense; underparts slightly lighter, usually faintly tinged with buff; upper surfaces of hind feet paler on inner margins rather than wholly dark; tail averaging paler below; skull larger in most dimensions (see Table 1) and more massive; nasals more expanded anteriorly; infraorbital canals narrower when viewed from the front; auditory bullae and cheekteeth larger. From *Microtus fortis calamorum* of northeastern China (specimens from Yochow, Hunan), *M. f. uliginosus* differs in: Upper parts distinctly darker (less buffy) and more glossy in appearance; tail darker above; underparts more buffy; skull conspicuously larger and more massive.

Remarks.—*Microtus fortis uliginosus* most closely resembles *M. f. pelliceus* among named subspecies. Externally it differs from *pelliceus* only slightly in color and size, but it averages larger than that subspecies in a number of cranial dimensions. At present the new subspecies is known only from a restricted area in central Korea just north of the 38th Parallel of latitude. It occurs there in lowland habitats, principally along stream banks and in abandoned paddy fields.

Kuroda (Jour. Mamm., 15:231, 1934) reported *M. f. pelliceus* from Bampo and near Yuki in extreme northeastern Korea. The records herein enumerated for the new subspecies extend the known range of the species southward on the Korean peninsula nearly 400 miles. For additional cranial measurements of *M. f. pelliceus*, see Tokuda (Bull. Biogeog. Soc. Japan, 4:139-140, 1941).

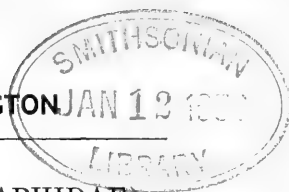
Specimens examined.—Seventy-five, all from Korea, as follows: Chip'o-ri, 43 (USNM 294651-59, 294661-63, 298070-72, 298078-89, 298958, 299509-15, 300647, 301252-53, 301256; Mus. Nat. Hist., Univ. Kansas, 60442, 63839-41; Mus. Zool., Univ. Michigan, 99592); 1½ mi. NW Chip'o-ri, 140 meters, 1 (Mus. Nat. Hist., Univ. Kansas, 60437); 2 mi. N Chip'o-ri, 150 meters, 1 (USNM 298959); 3 mi. NW Chip'o-ri, 145 meters, 6 (USNM 298961-63, 299096-97; Mus. Nat. Hist., Univ. Kansas, 60443); Ch'ongyang-ni, 8 (USNM 294660, 294664, 298090-93, 298099-100); Ch'onsong-ni, 1 (USNM 298094); Kumhwa, 6 (USNM 294665-66, 298096-98; Nat. Sci. Mus. Japan, 1 specimen); Taegwang-ni, 90 meters, 2 (USNM 301255; Mus. Nat. Hist., Univ. Kansas 60440); Ugu-dong, 3 (USNM 298957, 298960, 301254); White Horse Mt., near Ch'orwon, 1 (Mus. Comp. Zool., Harvard, 47136); Yoneh'on, 1 (USNM 301257); Yongp'yong, 110 meters, 1 (Mus. Nat. Hist., Univ. Kansas, 60441).

TABLE 1. Cranial measurements of two subspecies of *Microtus fortis*.

	Condylobasal length	Oecipitonasal length	Palatal length	Zygomatic breadth	Breadth across auditory bullae	Interorbital breadth	Length of nasals	Length of in- cursive foramina	Alveolar length of upper molari- form tooththrow
<i>Microtus fortis pelliceus</i> , Ussuri River, southeastern Siberia.									
BM 91.6.29.2, ♂ (type)	----	29.6	18.6	----	----	4.2	9.1	5.7	----
<i>Microtus fortis pelliceus</i> , Sungari River, 60 mi. SW Kirin, Manchuria.									
USNM 197863, ♂	32.2	30.9	19.1	17.9	14.8	4.2	8.7	6.0	7.8
USNM 197860, ♀	31.9	31.3	18.9	17.6	14.5	4.1	8.7	6.4	8.3
<i>Microtus fortis uliginosus</i> , Chip'o-ri, Korea.									
USNM 298078, ♀ (type)	33.2	32.5	19.3	18.3	15.0	4.4	8.9	6.0	7.9
Average 4 ♀	33.4	32.6	19.7	18.8	14.9*	4.4	9.2	6.0	8.4
Minimum	32.8	32.4	19.2	18.4	14.5	4.4	8.7	5.7	7.9
Maximum	34.0	33.2	20.2	19.7	15.6	4.5	9.5	6.3	9.0
Average 5 ♂	34.4	33.1	19.9	18.7	15.1	4.5	9.1	6.3	8.4
Minimum	33.9	32.2	19.5	18.4	14.6	4.3	8.5	5.9	8.1
Maximum	35.0	33.6	20.2	19.2	15.4	4.7	9.6	6.5	8.7

*Three specimens

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



THREE NEW SPECIES OF *CINARA* (APHIDAE)

By F. C. HOTTES

It is a pleasure to acknowledge the assistance of Dr. L. G. Gentner, Prof. Carl Johansen and Mr. M. J. Forsell who sent me material for one of the new species described herewith.

Cinara caliente n. sp.

Apterous viviparous female.

Size and color.—Length from vertex to end of anal plate varying from 2.02-2.17 mm. Width of head through eyes .47 mm.. Head dusky-gray if no powder is present, if with powder, dusky, mottled with powder, the powder not being uniform in distribution. Mid dorsal region of thorax black, lateral regions of thorax with much powder and almost white. Black portion of prothorax narrow, that of mesothorax somewhat wider, that of metathorax still more extensive and as a rule more or less split in the mid posterior region. First abdominal segment black, except for median region. Sometimes the black on the thorax and the first abdominal segment gives the appearance of an inverted V, the arms of which extend lateral to the abdomen. Remainder of abdomen except for cornicles which are black, dusky-gray more or less mottled with powder, the dusky being more abundant between the cornicles, and extending from them in an irregular pattern towards the middle. First and second antennal segments dusky, base of third, fourth and fifth antennal segments white, with the tips of the segments light dusky, all of the sixth antennal segment dusky. Femora with proximal region white, remainder dusky. Tibiae with short dusky region near base followed by a clear area to about the middle, remainder of tibiae dusky.

Head and thorax.—Antennal segments with the following lengths: III .27-.32 mm., IV .10-.13 mm., V .17 mm. VI .09 + .02-.03 mm. Sensoria distributed as follows: III 0-1 almost always none, IV none, V 1 with primary sensorium always present. Antennal hair very sparse, rather spine-like, less than half width of segment in length. All antennal segments except the extreme tip of the sixth smooth. Hairs on anterior portion of head slightly longer than on the third antennal segment, of the same type and rather sparse. Marginal sensoria on sixth antennal segment small, few in number and often difficult to determine. Ocular tubercles present but very small, much rounded. Rostrum when extended reaching beyond metathorax, in a few cases almost reaching the anterior portion of the cornicles. Hair on femora short, almost spine-like. Hind tibiae 1.29 mm. in length. Hair on hind tibiae slightly longer than width of tibiae on outer margin slightly shorter than width on inner, rather sparse, and spine-like, set at an angle of

about forty-five degrees. Hair at apex of tibiae longest. First tarsal segment with about eight hairs on the ventral surface, these are located on the apical half of the segment, these hairs are rather short. Hairs on dorsal surface of second tarsal segment fewer and longer than those on the ventral surface, they are also more spine-like.

Abdomen.—Dorsum of abdomen with a few short spine-like hairs, hairs on ventral surface numerous, longer and finer than those on the dorsum. Dorsum of abdomen with a few small irregular shaped pigment spots, these show no particular arrangement and vary in size. These spots are more or less wrinkled and suggest the pigmented spots on the dorsum of *C. laricis* (Hartig) except for size, the larger spots as a rule have two hairs, the smaller ones one. Hair on the dorsum is not confined to the pigmented spots, in length it is about .02 mm. or only slightly more. Outer base of cornicles very irregular, varying from .20-.25 mm. Cornicles provided with very few hairs, in most cases not more than six, rarely eight, and often as few as four, these may be as short as those on the dorsum of the abdomen, or slightly longer. Transverse pigmented areas anterior to cauda very irregular in outline more or less united, and with about three hairs on each half. Hairs on cauda confined largely to outer margin.

Alate viviparous female.

This form which varies from 1.80-2.10 mm. in length is suggestive of the apterous viviparous female in color of head and abdomen. The thoracic lobes are gray or more or less white if provided with powder, the powder being as a rule rubbed on the edges of the lateral lobes. Secondary sensoria with the following distribution: III zero—2, IV zero to 1, V 1. The third antennal segment always with a primary sensorium, this may be present or lacking on the fourth antennal segment, so that this segment may be without sensoria, fifth segment with primary sensorium. Media of fore wings two branched, the second branch closer to the margin of wing than to the first branch. Veins pale. Hind tibiae about 1.45 mm. in length. Hairs on hind tibiae longer than those of apterous viviparous female, and slightly more numerous. Lateral portions of lateral thoracic lobes free from hair. Anterior median thoracic lobe free from hairs, posterior thoracic lobe with only a few. Dorsum of abdomen free from pigmented spots. Transverse pigmented spots anterior to cauda very small divided, with three or four hairs on the posterior margin.

Oviparous female.

Similar to apterous viviparous female except for region posterior to cornicles which has a heavy coat of powder, this may extend forward in the mid dorsal region to the middle of the cornicles, and in some few cases extend to and slightly cover the posterior margin of the cornicles. The hind tibiae are only slightly swollen, the sensoria on them extend the full length of the tibiae, but are not numerous. The cornicles of this form have a smaller base than the viviparous females, and the dorsum of the abdomen is almost free from pigmented spots, the few present being extremely small.

Alate male.

Head and thorax dusky, older specimens have little powder, the

higher regions of the thoracic lobes being almost shining, the median thoracic lobe alone with heavy powder. Abdomen more or less greenish-gray, with some powder through which some dusky areas show. Mounted specimens show no pigmented spots on the dorsum of the abdomen. Length from vertex to end of anal plate about 2.10 mm. Secondary sensoria distributed as III 24-27, IV 5-7, V 4-6, VI 0-1.

In Palmer's key to the genus *Cinara* in "Aphids of The Rocky Mountain Region" this species keys to *C. atra* G&P. *C. caliente* differs greatly from *C. atra*, and it is necessary to mention only a few outstanding differences. *C. atra* is without powder, is black and shining, the first tarsal segment has extremely long somewhat curved or bent hairs on the ventral surface, the male is apterous, the fourth rostral segment is longer, and the alate viviparous female has more secondary sensoria on the third antennal segment.

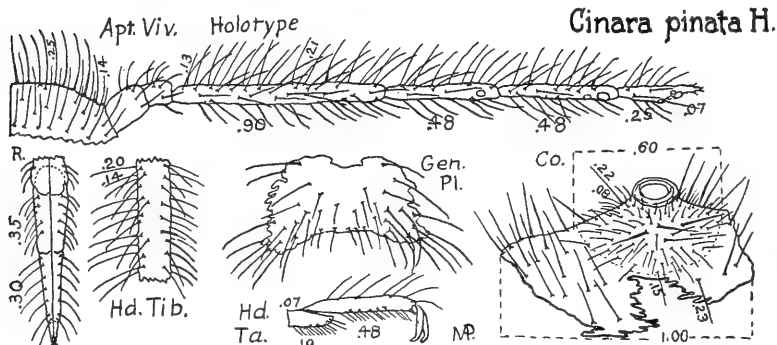
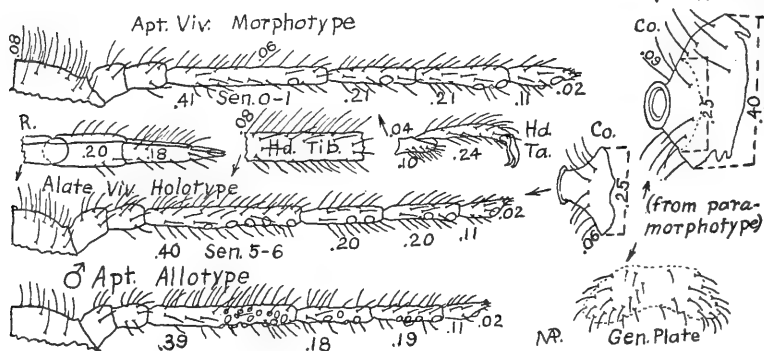
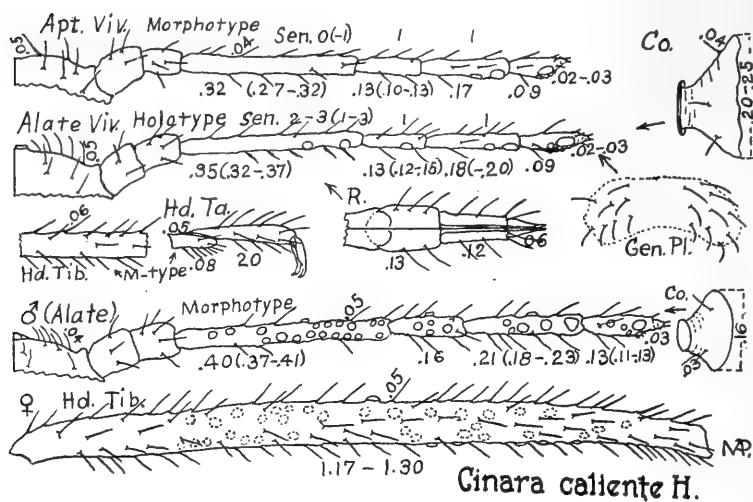
This species was first taken on two atypic much stunted trees of *Pinus edulis*. The terminal branches of which were extremely long and very very thin, and free from needles for long distances. The specimens being taken on the needle free areas in small groups. It was taken on no other trees, and was reared on the branches of other trees only with great difficulty and high mortality, after becoming established on the new host branches, equal difficulty was experienced, when the specimens were transferred to branches of the original host. Type locality seventeen miles south west of Delta, Colorado, on the road to Twenty-five Mile Mesa. Holotype, morphotypes and allotype reared in Grand Junction, Colorado on original material.

Holotype, alate viviparous female Aug. 15, 1955, morphotype, apterous viviparous female Aug. 12, 1955, morphotype, oviparous female Sept. 26, 1955, allotype, alate male Sept. 17, 1955, all reared in Grand Junction, Colorado. All types deposited in the United States National Museum.

Cinara pinata n. sp.

Apterous viviparous female.

Size and color, head.—Length of body from vertex of head to end of anal plate varying from 2.97-3.36 mm. Head and thorax dark dusky-brown with just a trace of powder. Dorsum of thorax with two small black spots to each segment. Dorsum of abdomen varying with season, in summer, deep brown to almost bronze, when thus, with a yellowish mid dorsal line and free from powder. In fall darker brown to deep dusky-brown, when thus with a median somewhat broken line of powder, and with a small patch of powder anterior to each cornicle, this powder may be only a small dash. Cornicles very dark brown and shining. Between the cornicles there are two L shaped areas back to back, these are dull black, and are separated from each other either by the yellowish line or the line of powder. The rest of the dorsal surface of the abdomen is only moderately polished and rather rough, mounted specimens show this surface reticulated. First and second antennal segments similar to head. Third antennal segment yellowish except for apex which is dusky. Fourth and fifth antennal segments with basal half or more yellowish, remainder dusky. Sixth segment dusky. Sensoria with following distribution: III 0-1 the sensorium if present is small, and may not be primary, IV 0-2, if only one sensorium is present it is apt to be



far removed from the apex, V 2, the primary sensorium on this segment is large and has a wide rim. The primary sensorium on the sixth segment is large, has a wide rim, the marginal sensoria are few in number, have wide rims and are far removed from the primary. Unguis of sixth segment very short. Hair on antennae numerous rather upstanding about .06 mm. in length, the longest being just longer than the width of segment. Hair on sixth segment numerous for this segment. Length of antennal segments as follows: III .41 mm., IV .15-.24 mm., V .17-.25 mm., VI .1 + .02 mm. Width of head through the eyes .67-.71 mm. Hair on dorsum of head .06-.08 mm. in length. Median suture of head narrow. Ocular tubercles moderately well developed. Extended rostrum reaching to or slightly beyond cornicles.

Thorax.—Mesosternal tubercle present but not well developed. Femora dusky-brown except for region near body which is yellowish. Tibiae with extreme base dusky, this area is followed by a yellowish region and this in turn is followed by dusky, the yellowish area is more extensive on the pro and mesothoracic tibiae than on the metathoracic tibiae. Hair on hind tibiae numerous, curved from the middle downwardly, about .06 mm. in length on the outer margin and less on the inner. Length of hind tibiae 1.93-2.14 mm. First tarsal segment .11 mm. in length, second tarsal segment .24-.26 mm. in length. The first tarsal segment has about twenty hairs on the ventral surface. The ventral surface of the second tarsal segment has the hairs more numerous than those on the dorsal surface, these hairs are also slightly shorter than the hairs on the dorsum of this segment.

Abdomen.—Base of cornicles varying from .25-.40 mm. Outer margin of cornicles very irregular, mounted specimens show the cornicles two toned, the rim being much darker than the base. Hair on cornicles few, most numerous on the darker area. The dorsum of the abdomen has few hairs. The dorsum of the abdomen is reticulated, the reticulations are very small and very fine. Transverse pigmented spots large, provided with a row of long fine hairs on the posterior margin, anterior to these there are two irregular shaped much broken pigmented spots, these have a few short spine-like hairs. The cauda is pale at the base, the hair being restricted to the posterior margin.

Alate viviparous female.

Color not observed when alive. Length from vertex to end of anal plate 2.9 mm. Antennal segments with the following lengths: III .40-.44 mm., IV .19-.23 mm., V .21-.27 mm., VI .1-.11 + .02-.03 mm. Sensoria distributed as follows: III 3-5 secondary in a row plus primary sensorium, IV none to one secondary plus primary, V one plus primary. Length of hair on third antennal segment varying from .05-.07 mm. rather numerous and upstanding. Width of head through the eyes .65-.70 mm. Rostrum reaching almost to end of abdomen. Hind tibiae varying from 2.1-2.4 mm. Hair on hind tibiae numerous about .08 mm. in length, fine and sharp-pointed, rather more numerous towards the apex. Width of base of cornicles .26-.30 mm. Media of fore wings twice branched the second branch about mid way between the first and the margin of the wing. The media of the holotype is not typical.

Oviparous female.

This form is quite similar to the apterous viviparous female, as a rule specimens are darker in color, but have no more powder, the mid line of powder on the dorsum may be lacking. The basal half of the hind tibiae is quite swollen and it is on this half that most of the sensoria are confined, few if any extending beyond the middle. The sensoria even on the basal half are extremely difficult to differentiate, but are numerous if not typical.

Apterous male.

In color this form is similar to immature females, being gray with patches of powder in front of cornicles. It is 2.17 mm. in length. The antennal segments have the following lengths: III .39, IV .18 mm., V .19 mm., VI .11 + .02 mm. Secondary sensoria distributed as follows: III 13-17, IV 5, V 1-2. The primary sensorium on the third antennal segment is small, the primary sensoria on the fourth and fifth segments are normal in size. Care must be used to differentiate the secondary sensoria on the third segment from the base of the hairs, the two being of the same size and color.

This species was collected on *Pinus edulis*. On this host it feeds on the bark of four or five year old branches and in a few cases on branches which are younger. The colonies are always small, apparently new colonies are established when the colonies cover about an inch of branch.

I suspect that this species is most closely allied to *C. pinona* H. From *pinona* it differs in the following respects to mention only a few, the unguis is very much shorter, the antennae have more hair, the hair on the tibiae are less abundant also less drooping.

Holotype, alate viviparous female Aug. 2, 1955, Morphotype, apterous viviparous female Aug. 25, 1955, Morphotype, oviparous female Oct. 5, 1955, Allotype, apterous male September 29, 1955. All types taken on type tree, growing just north of the parking area adjacent to the picnic grounds of the Colorado National Monument, Fruita, Colorado. All types deposited in the United States National Museum. Numerous specimens were reared on branches.

Cinara sonata n. sp.*Apterous viviparous female.*

Size and general color.—Length from vertex to end of anal plate varying from 5.25-7 mm. Dr. Louis G. Gentner, of the Southern Oregon Branch Experiment Station, Medford, Oregon, who collected some of the specimens from which this species is described, kindly supplied the following color notes "Dull reddish-brown, with darker appendages, and with black markings on dorsum and a black blotch around each cornicle." The first antennal segment is concolorous with the head, the second segment is not quite so dark, the third and fourth antennal segments are yellowish except for the apical portions of the segment, which are dusky, the dusky area on the fourth segment being the most extensive. The fifth and sixth antennal segments have the dusky area equal to about half of the segment. The femora are black except for the extreme basal portion. The prothoracic tibiae are black throughout,

the meso and metathoracic tibiae are black, however some specimens show a very dark brownish area a short distance below the basal end, this area is always short. The tarsi are black. The cornicles are black.

Head and thorax.—Antennal segments with the following lengths: III .75-1.05 mm., IV .40-.48 mm., V .45-.58 mm., VI .225-.27 mm. + .07 mm. The third antennal segment is without sensoria, the fourth antennal segment may lack secondary sensoria, or have one or two, all sensoria on this segment are small. The fifth antennal segment has one secondary sensorium and the primary. Antennal hair numerous, upstanding, that on anterior margin of third segment more abundant than that on posterior margin of segment, and about .20-.21 mm. in length. Only the sixth antennal segment imbricated. Hind tibiae about 4.00 mm. in length. Hair on hind tibiae numerous, upstanding varying on outer margin from .14-.20 mm. in length. Hair on inner margin of hind tibiae more numerous, finer and shorter than hair on outer margin, also less upstanding. First tarsal segment about .18 mm. in length, ventral surface with numerous hairs, these are difficult to count, but number more than twenty and in one case twenty-seven. The mesosternal tubercle is absent.

Abdomen.—Cornicles with the base very irregular and deeply and irregularly indented on both sides. The base of the cornicles measure from .90-1.00 mm. the long way. The cornicles are provided with numerous hairs, which vary in length from .08-.22 mm. in length. The longest hairs being spine-like, the other hairs of which there are about two lengths are much finer, the shortest hair being the finest, and confined for the most part to the constricted area of the cornicle. The dorsum of the abdomen has many hairs, these are of various lengths and character, the longest being about .16 mm. in length, the shortest and finest about .105 mm. in length. The dorsum of the abdomen has numerous pigmented spots, these are the largest posterior to the cornicles. The pigmented spots are without arrangement, vary greatly in size, and shape, most have hairs. Pigmented spots anterior to the cauda with two rows of long hairs along the posterior margin. Hairs confined to posterior margin of cauda.

This species is most closely allied to *Cinara abieticola* (Chol.) and differs from specimens of that species collected in Europe and America as follows: The pigmented spots on the dorsum of the abdomen are smaller and are not arranged in two rows, the cornicles are larger, and are deeply indented along the outer margin, the outer margin of the cornicle is very irregular, the tarsal segments are much longer, the first tarsal segment has more hairs on the ventral surface.

All specimens of this species were collected on *Abies*. Holotype, taken on *Abies grandis*, Priest Lake, Idaho, Aug. 28, 1954 by Prof. Carl Johansen of the Department of Entomology, State College of Washington. Paratypes as follows: *Abies magnifica* var. *shastensis* L. G. Gentner, Mt. Ashland, Oregon Sept. 2, 1954, *Abies concolor*, M. J. Forsell, Seattle, Washington, Aug. 20, 1955, and L. G. Gentner, Mt. Ashland, Oregon Aug. 12, 1955, on *Abies magnifica* var. *shastensis*. Holotype deposited in the United States National Museum.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS

Two meetings of the Biological Society of Washington have been held during the year.

1021st Meeting — March 28, 1956

SEVENTY-SEVENTH ANNUAL MEETING

Vice-President Friedmann in the chair; 12 persons present. Informal reports by the Publications Committee and the Treasurer were presented.

The following officers and Members of Council were elected:

President, Herbert Friedmann; Vice-Presidents, Alan Stone, H. B. Owens, D. H. Johnson, A. C. Smith; Recording Secretary, S. F. Blake; Corresponding Secretary, John L. Paradiso; Treasurer, A. J. Duvall; Custodian of Publications, D. H. Johnson; Members of Council, M. K. Brady, F. A. Chace, C. O. Handley, Jr., Louise M. Russell, Viola S. Shantz.

1022d Meeting — November 14, 1956

Joint meeting with Audubon Society of the District of Columbia, in room 43 of the U. S. National Museum.

Formal Communication: William J. L. Sladen, The life history of the Adelie Penguin.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FURTHER ADDITIONS TO THE LIST OF BIRDS OF
VENEZUELA

BY ALEXANDER WETMORE AND WILLIAM H. PHELPS, JR.

Examination of specimens in the Phelps Collection and of comparative material in the United States National Museum and the American Museum of Natural History has shown to the authors some species and subspecies which they believe to be new, that are described in the body of this paper.

These new birds were obtained by Sr. Ramón Urbano of the Phelps Collection, on several recent field expeditions. Three of the localities concerned, viz., Caripe, Bramón and Cerro Chimantá-tepui, appear in standard publications on the ornithology of Venezuela. Cerro de la Neblina is a sandstone, table-top mountain in extreme southern Venezuela at the headwaters of the Río Yatúa, nearly on the Brazilian border. Río Chiquito rises on the eastern slopes of the massif that culminates in the Páramo de Tamá, and is in the Orinoco river watershed. Burgua is situated near the river of the same name in the foothills near the eastern base of the same massif, on the Táchira side of the river.

FAMILY TINAMIDAE.

Crypturellus noctivagus cursitans subsp. nov.

Characters.—Similar to *Crypturellus noctivagus idoneus* (Todd)¹, but much darker; more rufescent, on the sides of the head and the entire dorsal surface; darker below also, except for the white throat; upper breast with gray more prominent, and darker.

Description.—Type, Phelps Collection no. 58,544, male, from San Luis, near Burgua,, 530 meters elevation, Estado Táchira, Venezuela, collected November 23, 1952, by Ramón Urbano; (on deposit in U.S. National Museum). Forehead mouse gray, shading to dark mouse gray on the center of the crown, and then gradually becoming warm sepia on the nape, this color continuing over the hindneck; base of the hindneck washed with deep neutral gray; back natal brown shading through bister on the rump, the feathers tipped narrowly with dusky neutral gray; upper tail coverts snuff brown, barred indistinctly with clay color and tawny olive, and irregularly with dusky neutral gray; outermost lesser wing coverts deep neutral gray, forming a definite shoulder patch, contrasting with the Saccardo's umber of the inner series; alula and remiges fucous-black, the outer webs of the primaries becoming fuscous, the longer ones with a narrow edging of Saccardo's umber at the tip on the outer web; middle and greater coverts Saccardo's umber, barred irregularly with dusky neutral gray, cinnamon-

¹ *Crypturus idoneus* Todd, Proc. Biol. Soc. Washington, vol. 32, June 27, 1919, p. 117 (Bonda, Magdalena, Colombia).

buff and clay color; secondaries marked irregularly on outer webs with pinkish buff, and cinnamon buff, the innermost natal brown like the back, with broken bars of dusky neutral gray and tawny olive; lores, space under eyes, and stripe from base of mandible to below the ear coverts, cinnamon; ear coverts, space behind eye, and sides of neck verona brown; throat clear white, changing to mouse gray on foreneck and upper breast, with a faint wash of verona brown as an indistinct edging on the feathers of the foreneck; breast light cinnamon-buff, becoming paler on the upper abdomen; sides drab; flanks barred broadly with dark neutral gray, narrowly with cinnamon-buff, and tipped with cartridge buff; lower abdomen cinnamon-buff, barred narrowly with dark neutral gray; under tail coverts clay color, marked irregularly with dull black; outermost under wing coverts deep neutral gray, the innermost light neutral gray; axillars light mouse gray, tipped with pale pinkish buff. Maxilla fuscous-black; mandible pale, dull cream-buff (from dried skin); tarsus and toes reddish brown (from collector's label, dull tawny-olive in dried skin).

Measurements. Males (3 specimens), wing 162-165 (163.3), tail 55.6-58.8 (56.7), culmen from base 27.2-30.6 (28.8), tarsus 48.9-49.2 (49.1) mm.

Type, male, wing 162, tail 55.6, culmen from base 28.7, tarsus 49.2 mm.

Range. Known from Campamento Petrolero (400 meters elevation), San Luis (530 meters) and Mata de Nigua (600 meters), all near Burgua, southern Táchira, Venezuela.

Remarks. The present form, recognizable at a glance because of its deeper, more rufescent color, clearly is connected most closely with the race *idoneus* that extends into northwestern Zulia from the Guajira Peninsula, and ranges south along the eastern base of the Sierra de Perijá to beyond Machiques. It is presumed that the distribution of *C. n. cursitans* may extend through southwestern Lara to Táchira though no specimens from this area are yet available.

It is curious to note that the form from Táchira that we describe in these notes superficially is closely similar to another race of the species, *Crypturellus noctivagus columbianus* (Salvadori) of western Bolívar and northern Antioquia in northwestern Colombia. *C. n. cursitans* differs from *columbianus* in having the sides of the head and neck brighter brown, the secondaries with bolder markings, and the tips of the axillars buff. The two forms are separated completely by the pale colored *C. n. idoneus* which is found in the broad expanse of land between.

FAMILY APODIDAE

Chaetura vauxi aphanes subsp. nov.

Characters. Similar to *Chaetura vauxi richmondi* Ridgway², but throat less clearly white, having a very light brownish gray cast; pale color of foreneck extended to or onto the upper breast; rump and upper tail coverts paler, more brownish gray.

² *Chaetura richmondi* Ridgway, Proc. Biol. Soc. Washington, vol. 23, April 19, 1910, p. 53 (Guayabo, Costa Rica).

Similar also to *Chaetura vauxi ochropygia* Aldrich³, but throat and foreneck differing as in *C. v. richmondi*; breast and abdomen slightly darker; slightly larger.

Description. Type, Phelps Collection no. 22856, male, Caripe, Estado Monagas, Venezuela, 800 meters elevation, taken July 31, 1943, by Ramon Urbano; (on deposit in U.S. National Museum). Crown, hind-neck, upper back and wings dull black, with a very faint sheen of olivaceous black; lower back and rump between light drab and light grayish olive; upper tail coverts slightly grayer than light drab; rectrices chaetura black, with the inner webs shaded with light drab; lores chaetura black; sides of head hair brown; throat and foreneck pale grayish white; breast, sides and abdomen hair brown; flanks, under tail coverts and under wing coverts chaetura drab. Bill dull black; tarsus, toes and claws fuscous (from dried skin).

Measurements. Males (12 specimens), wing 112.5-115.4 (114.3), tail (6 individuals) 34.3-37.7 (36.1), culmen from base 5.4-6.2 (5.6), tarsus 10.0-11.5 (10.8) mm.

Females (7 specimens), wing 110.0-115.7 (113.8), tail 38.7-39.2 (38.9), culmen from base 5.1-5.9 (5.5), tarsus 10.0-11.1 (10.7) mm.

Type, male, wing 115.4, tail 35.8, culmen from base 5.4, tarsus 11.5 mm.

Range.—Northern Venezuela: Known at present from Lara (Boguerón), Yaracuy (Bucará, San Felipe), Carabobo (Cumbre de Valencia), Aragua (Turiamo, Colonia Tovar, Cerro Golfo Triste), Distrito Federal (El Limón, Caracas), Miranda (Petare, Curupao, Guarenas), Anzoátegui (Bergantín), and Monagas (Caripe).

Remarks.—The discovery of a breeding population of *Chaetura vauxi* in northern Venezuela announced by Sutton and Phelps⁴ has added considerably to the known range of the species, which however remains otherwise unknown east of central Panamá, except for the region immediately adjacent to the Canal Zone, and the Pearl Islands (San José, Pedro González).

Comparison of additional material from Central America and Panamá with the extensive series in the Phelps Collection now has shown that the birds of Venezuela belong to a distinct race, readily perceptible when birds of similar age are compared, but easily confused with *C. v. richmondi* when immature birds, marked by whitish tips on primaries and secondaries, are not segregated from the adults. It seems to have been this that led to the earlier identification of the Venezuelan series as *C. v. richmondi*, the immature birds being darker than the adults. Freshly taken skins are faintly grayer than older museum specimens, which become slightly brownish with storage in museum trays, but the change is not extensive. The specimens used in the present study are properly comparable, since their range in age as museum specimens is in close agreement.

The somewhat smaller size of *C. v. ochropygia* is indicated by the following measurements from the adults in the series from southern Veraguas (Soná) and the Pearl Islands in the U.S. National Museum:

³ *Chaetura vauxi ochropygia* Aldrich, Sci. Publ. Cleveland Mus. Nat. Hist., vol. 7, Aug. 31, 1937, p. 68 (Paracoté, 1 mile south of the mouth of Río Ángulo, Montijo Bay, Veraguas, Panamá).

⁴ Sutton and Phelps, Occ. Papers Mus. Zool. Univ. Michigan, no. 505, Jan. 14, 1948. pp. 1-6; Sutton, Wilson Bull., vol. 60, no. 3, Sept., 1948, pp. 189-190.

Males: (11 specimens), wing 108.0-112.2 (109.4), tail 33.0-38.2 (35.0), culmen from base (10 individuals) 5.0-5.4 (5.3), tarsus 10.2-11.2 (10.6) mm.

Females (6 specimens), wing 108.2-110.8 (109.1), tail 32.7-35.0 (34.1), culmen from base 5.0-5.5 (5.3), tarsus 10.0-10.8 (10.4) mm.

FAMILY TROCHILIDAE

Amazilia distans sp. nov.

Characters.—Size and general appearance that of *Amazilia fimbriata* (Gmelin)⁵ but with a glittering crown spot, different in color from the rest of the head; shining blue (instead of green) on the foreneck and upper breast.

Description.—Type, Phelps Collection no. 60790, male, from El Salao, 300 meters elevation, near Burgua, Estado Táchira, Venezuela, taken July 17, 1954, by Ramón Urbano; (on deposit in U.S. National Museum). Fore crown, from forehead to level of the posterior margin of the eyes, glittering benzol green; posterior part of crown and hind-neck shining cossack green; back, wing coverts and rump shining grass green; upper tail coverts shining carob brown; remiges dull purplish black; rectrices dull blue-green black; throat, foreneck and upper breast glittering spectrum blue; feathers of throat edged with white producing a spotted effect; sides shining grass green, spreading across lower breast where the feathers are edged widely with olive-gray; abdomen pale olive-gray; flanks white, the feathers forming a tuft on either side; under tail coverts deep quaker drab margined with dull white; under wing coverts and edge of wing shining grass green. Bill reddish in life, tipped with black, tarsi and toes dull black.

Measurements.—Male (type), wing 51, tail 27.3, culmen from base 20 mm.

Range.—Known only from near Burgua, in southern Táchira, Venezuela.

Remarks.—The type, the only specimen known while compared with *Amazilia fimbriata*, differs definitely in the glittering blue foreneck and upper breast, and in possessing a crown spot differing in color from the rest of the head. Apparently the basal half of the bill in life was distinctly more red, also. The appearance of the specimen is so distinct from that of other species of the genus that we have no hesitance in describing it as representing a new species.

FAMILY FURNARIIDAE

Philydor hylobius sp. nov.

Characters.—Similar to *Philydor atricapillus* Wied⁶, but tail equal to wing instead of shorter; feet and tarsi decidedly heavier; more deeply rufescent throughout; ear coverts entirely dark.

Description.—Type, Phelps Collection no. 59683, sex ♀, high slopes of Cerro de la Neblina, 1800 meters, Territorio Amazonas, Venezuela, collected January 26, 1954, by Ramón Urbano (on deposit in U.S.

⁵ *Trochilus fimbriatus* Gmelin, Syst. Nat., vol. 1, pt. 1, 1788, p. 493.

⁶ *Anabates atricapillus* Wied. Reise Bras., vol. 2, 1821, p. 147 (p. 146 in 8vo ed.) (Rio Catolô, Bata, Brasil).

National Museum). Crown and hindneck Prout's brown, with faintly indicated edgings of hazel; back, rump, upper tail coverts and wing coverts warm cinnamon-brown; secondaries and inner primaries between cinnamon-brown and ochraceous-tawny, except for the outer portions of the inner webs, which are dark neutral gray; outer primaries dark neutral gray with the outer webs ochraceous-tawny; a broad superciliary, extending from the nostril to posterior end of the pileum, tawny; space in front of eye, extending back across lower eyelid and auricular area, Dresden brown; a single line of feathers in center of lower lid tawny, bordered by Dresden brown on either side; under surface ochraceous-tawny, shading to cinnamon-brown on flanks and under tail coverts; feathers of throat and foreneck white basally; under wing coverts tawny. Maxilla, and tip and cutting edge of mandible, fuscous; rest of mandible olive-buff; tarsus and toes hair brown (from dried skin).

Measurements.—Type (sex not known), wing 76.4, (tail lacking), culmen from base 19.0, tarsus 22.0 mm.

Female, immature, wing 78.0, tail 82.0, culmen from base 18.7, tarsus 21.3 mm.

Range.—Known only from the subtropical zone on the high north-western slopes of Cerro de la Neblina, southeastern Territorio Amazonas, Venezuela.

Remarks.—The present species is the most unusual of the birds found on the higher slopes of Cerro de la Neblina, where apparently it is uncommon, since only two were taken during two weeks of intensive collecting. The second of these is a female in full juvenal plumage (Phelps Collection no. 59684) that differs somewhat from the adult as indicated in the following: Head and neck Prout's brown, the feathers tipped lightly with dusky neutral gray, producing faintly-indicated squamations; back cinnamon-brown, changing to russet on the rump and upper tail coverts; wings as in the adult; tail Mars brown; foreneck, breast and abdomen buckthorn brown, tipped lightly with dusky neutral gray, forming slightly indicated squamations; sides and flanks Dresden brown; under tail coverts tawny; markings on sides of head as in the adult. The long tail is much graduated, and has the attenuated slender points characteristic of juvenile individuals in species of this genus. The bird has not yet begun the molt to the first post-juvenal plumage. This topotype is also placed on deposit in the U.S. National Museum, that the characters of the tail and of the juvenal plumage may be available for examination with the type.

The bird here described is closely allied to the type species of the genus *Philydor atricapillus*, that ranges from Baía and Minas Geraes to Paraguay and northern Argentina, which it resembles in general terms of pattern and color. The more slender bill and the heavier feet and tarsi, coupled with the color differences described, give it status as a species.

We have hesitated in preparing this description due to the imperfection of the adult individual which lacks the tail, but have given it a name because of its outstanding uniqueness, and since it may be long before further collections are available from the remote mountain that is its home.

FAMILY FORMICARIIDAE.

Grallaria chthonia sp. nov.

Characters.—In general, resembling the South American forms with streaked breasts at present grouped as races under the species name *Grallaria guatemalensis* Prévost and Des Murs, but with breast, sides and upper abdomen lightly but definitely barred; decidedly darker and more olive throughout, especially on the lower surface, throat dark olive; bill relatively longer, in proportion to its width at base.

Description.—Type, Phelps Collection no. 61055, male, from Hacienda La Providencia, 1800 meters elevation, Río Chiquito, Táchira, Venezuela, collected February 10, 1955, by Ramón Urbano (on deposit in U.S. National Museum.) Pileum to the level of the posterior margin of the eyes sepia, becoming Saccardo's umber on forehead, with each feather edged narrowly with black around the exposed margin; posterior part of crown and hindneck neutral gray, also margined with black, except in the line of an indistinct superciliary, extending from the center of the eye back above the ear coverts, in which the black edging is absent or very slightly evident on a few of the feathers; feathers of this superciliary anteriorly becoming whitish basally, tipped with buffy brown, and extending thus to base of bill behind nostril; back, scapulars and rump between light brownish olive and brownish olive, the feathers edged narrowly with black; upper tail coverts cinnamon-brown; rectrices sepia, with the exposed webs bister; wing coverts and outer webs of secondaries olive-brown; primaries fuscous-black, the outer webs edged with olive-brown; loreal area mixed blackish and buffy brown; space beneath eye clove brown, with the anterior feathers whitish to buffy brown basally; ear coverts and sides of neck olive-brown; a pronounced rictal streak extending from the base of the mandible to the level of the posterior margin of the ear coverts, with the feathers dull white basally, washed with cream-buff near the tips, and tipped with black; throat and upper foreneck with the feathers olive-brown basally, merging into dull black at the tips; lower foreneck with a broad spot in which the feathers basally are dull white becoming cream-buff, with an indefinite line of dull black separating the lighter basal color from the buffy brown tip; upper breast buffy brown with concealed whitish shaft streaks; lower breast and sides dull whitish, barred with mouse gray, the barring merging with the lighter color so that while distinct, the lines are not sharply delimited, the whole washed lightly with clay color; flanks with the barring more indefinite and the clay color wash more evident; lower abdomen dull whitish washed with chamois; under tail coverts slightly paler than buckthorn brown; under wing coverts ochraceous-buff, with the outer margin olive brown; axillars sepia, edged with cinnamon-buff; inner webs of innermost primaries and outer secondaries with a slight wash of chamois. Bill dull black, becoming pale olive-buff at base of mandible; tarsi and toes hair brown (from dried skin).

Measurements.—Male, type, wing 97.8, tail 38.7, culmen from base 26.8, tarsus 43.7 mm.

Range.—Known only from the type locality in the subtropical zone on the Río Chiquito in southwestern Táchira.

Remarks.—The barring noted on the lower surface, which though

not heavily contrasted with the basal coloration is clearly evident, together with the darker, less rufescent brown color in general, sets this bird apart from any others at present known in northern South America. The elongated, rather slender bill is much like that of *Grallaria allenii* Chapman, and is quite distinct from the heavier, broader form found in the various races of *Grallaria varia* (Boddaert). Also the bill is longer than that of *Grallaria guatemalensis carmelitae* Todd, being more like that of *G. g. regulus* Selater of Ecuador.

FAMILY COTINGIDAE.

Acrochordopus zeledoni bunites subsp. nov.

Characters.—Similar to *Acrochordopus zeledoni wetmorei* Aveledo and Pons⁷ but bill decidedly more slender; dark gray of crown extending down over the hindneck with only a trace of greenish wash; back slightly duller, less greenish; slightly darker below, especially on the breast, with the under tail coverts darker; edge of the wing darker.

Description.—Type, Phelps Collection no. 35992, sex not marked, western slope of Cerro Chimantá-tepui, 1300 meters elevation, Estado Bolívar, Venezuela, taken July 9, 1946, by Ramón Urbano (on deposit in U.S. National Museum). Forehead and a narrow superciliary stripe terminating at posterior margin of eye dull white; lores dark mouse gray; crown and hindneck deep mouse gray, the latter with a very faint greenish wash; back, scapulars, rump and upper tail coverts dull vetiver green; lesser wing coverts vetiver green; middle and greater coverts dull black, tipped with deep sea-foam green; inner primaries and secondaries edged with deep sea-foam green; rectrices dull hair brown, edged toward the base with dull deep grape green; sides of head dull white, including a row of feathers bordering the margin of the lower eyelid; chin and throat dull white becoming faintly yellowish green down the center of foreneck; area across the base of lower mandible, below eye, indistinctly barred with deep mouse gray; breast, abdomen and flanks between barium yellow and citron yellow, the breast heavily washed with grape green; sides grape green; under tail coverts dark olive-buff; under wing coverts Marguerite yellow, the inner ones becoming primrose yellow; edge of wing primrose yellow, mixed with dull hair brown; inner webs of primaries edged with dull white except at tips. Maxilla and tip of mandible fuscous; base of mandible grayish white; tarsus and toes deep mouse gray (from dried skin).

Measurements.—Type, sex not marked, wing 64.0, tail 46.5, culmen from base 9.0, width of bill at nostril 3.1, tarsus 14.0 mm.

Range.—Known only from the mountain Chimanta-tepui, Estado Bolívar, Venezuela.

Remarks.—The single specimen of this interesting bird has been under prolonged study because of the rarity of the species in museum collections. We have now seen the majority of those available, including the type of *A. z. leucogonys* (Selater and Salvin) in the British Museum (Natural History), and find that in none of the skins of the other races of *zeledoni* is the bill small as it is in *bunites*. In

⁷ Mem. Soc. Cienc. Nat. La Salle, no. 35, 1953, p. 203 (Jamayaujaina, Río Negro, Sierra de Perijá, Estado Zulia, Venezuela).

this character the race described here, isolated widely from its near relatives, is definitely peculiar.

The roughened scalation of the tarsus in *Acrochordopus* that marks this genus from any of its relatives is an unusual character. Aside from this, the tarsus is pycnaspidean. While Hellmayr has placed this genus in the family Tyrannidae, it is the carefully considered opinion of the senior author that Ridgway was correct in assigning *Acrochordopus* to the Cotingidae.

FAMILY VIREONIDAE.

Hylophilus aurantiifrons helvinus subsp. nov.

Characters.—Similar to *Hylophilus aurantiifrons saturatus* (Hellmayr)⁸ but decidedly darker above, especially on the crown which is deeper brown; sides of neck and upper breast with brownish wash darker and more extensive; flanks greener; under tail coverts darker yellow.

Description.—Type, Phelps Collection no. 58965, male, from Campamento Petrolero, 350 meters elevation, near Burgua, Estado Táchira, Venezuela, collected Nov. 5, 1952, by Ramón Urbano; (on deposit in U.S. National Museum). Crown and hindneck between Saccardo's umber and sepia, merging indistinctly into an area of dull reed yellow on the forehead, extending posteriorly slightly in the line of the anterior superciliary area; upper back, including scapular area, buffy olive; lower back, rump, and upper tail coverts dull citrine; wing coverts dull citrine, edged with yellowish citrine; primaries and secondaries deep mouse Gray, edged with yellowish citrine; rectrices olive-citrine, edged, especially toward the base, with yellowish citrine; loreal area, and an indistinct line extending back above the eye to its posterior margin, dull white; sides of head Isabella color, this extending down the sides of neck; throat and foreneck dull white; a wash of deep colonial buff across upper breast, shading into pale Isabella color at the sides; lower breast and abdomen reed yellow; under tail coverts citron yellow; sides and flanks olive yellow; under surface of rectrices yellowish olive, with inner webs margined with olive-yellow; edge of wing citron yellow; under wing coverts light barium yellow; inner webs of primaries and secondaries edged with primrose yellow. Iris dark; culmen blackish; rest of bill flesh color; legs grayish brown (from field label).

Measurements.—Males (3 specimens), wing 57.0-60.2 (58.1), tail 45.2-48.2 (47.0), culmen from base 14.3-16.3 (15.1), tarsus 15.4-16.8 (16.2) mm.

Female (one specimen), wing 55.4, tail 44.4, culmen from base 14.6, tarsus 17.0 mm.

⁸ *Pachysylvia aurantiifrons saturata* Hellmayr, Nov. Zool., vol. 13, no. 1, Feb. 24, 1906, p. 12 (San Antonio, "Cumaná" = Monagas). Hellmayr, Field Mus. Nat. Hist., Zool. Ser., vol. 13, pt. 8, Sept. 16, 1935, p. 171, says in his citation of the original description of this bird "no type locality indicated," and then proceeds to list a type specimen from "Rincon de San Antonio. State of Sucre, northeastern Venezuela." This is an oversight, however, since when he proposed the name he included as a footnote on the same page "Type: Mus. Tring. no. 978, Caracciolo coll. "Q" ad., San Antonio, Cumaná, March 18th, 1898." The location actually is in the northern part of the state of Monagas. Rincón de San Antonio is another place entirely, being located 10 miles distant.

Type, male, wing 57.0, tail 48.2, culmen from base 16.3, tarsus 15.4 mm.

Range.—Known in western Venezuela, from La Sierra (120 meters elevation), 12 kilometers southwest of Machiques, western Zulia, and from Burgua (250 meters elevation), southern Táchira.

Discussion.—This form, represented by 6 specimens in the collections available, is the most heavily pigmented of its species, being so decidedly darker than *H. a. saturatus* that it stands out at a glance from the long series of that race that we have examined. *H. a. helvinus* is supposed to range through the foothill region of western Zulia southward to the area of occurrence in Táchira.

***Hylophilus flavipes galbanus* subsp. nov.**

Characters.—Similar to *Hylophilus flavipes flavipes* Lafresnaye⁹ but more buffy, less yellow, on breast and sides, and whiter on abdomen; darker above.

Description.—Type, Phelps Collection no. 11458, male, from Bramón, Táchira, elevation 1200 meters, collected March 8, 1941, by Ramón Urbano; on deposit in U.S. National Museum. Crown Saccardo's olive; an indistinct line from above the eye forward onto the forehead deep colonial buff; back olive-citrine, becoming dull citrine on the rump; wing coverts dull citrine; remiges chaetura drab, edged with yellowish citrine, upper surface of rectrices dull citrine; sides of head buffy olive; throat olive-buff; foreneck and upper breast deep olive-buff, with a faint wash of buffy brown; lower breast and abdomen cartridge buff, washed with cream-buff; sides dull olive-yellow; under tail coverts slightly brighter than reed yellow; edge of wing reed yellow; under wing coverts amber yellow. Maxilla dark wood brown; mandible dull cream-buff; tarsus and toes dull chamois (from dried skin). Iris white (from collector's label).

Range.—Northern Colombia, from northeastern Magdalena at the eastern base of the Sierra Nevada de Santa Marta (La Cueva), and the valley of the Río Ranchería (El Conejo, Riohacha), east through the Comisaría de Guajira (Carriapía, Maicao) except for the eastern tip (where *H. f. melleus* Wetmore is found in the foothills of the Serranía de Macuire), south in northwestern Venezuela, through western Zulia (Paraguaipoa, La Esperanza, Las Múcuras, Villa del Rosario, La Sierra, Santa Barbara), extending again into Colombia along the eastern foothills of the eastern Andes in Norte de Santander (Cúcuta, Villa Felisa), south into Meta (Villavicencio); again in Venezuela east along the foothills of the Andes from Táchira (Santo Domingo, La Sabana near San Cristóbal, Bramón), and Mérida (El Vigía) through Barinas (Barinitas, La Veguita), and Portuguesa (Guanare, Acarigua) to eastern Yaracuy (San Felipe, Nirgua).

Measurements.—Males (33 specimens), wing 52.1-58.5 (55.6), tail 41.1-48.9 (44.5, average of 32), culmen from base 11.6-13.8 (12.8, average of 32), tarsus 16.9-19.3 (17.9, average of 31) mm.

Females (18 specimens), wing 50.8-57.5 (53.8), tail 40.7-46.4 (43.7), culmen from base 12.2-13.5 (12.8, average of 17), tarsus 16.3-19.0 (17.7) mm.

⁹ *Hylophilus flavipes* Lafresnaye, Rev. Zool., vol. 8, Sept., 1845, p. 342 (Bogotá, Colombia).

Type, male, wing 56.4, tail 42.8, culmen from base 12.8, tarsus 16.9 mm.

Remarks.—With the excellent series of skins now at hand in the U.S. National Museum and the Phelps Collection it is possible to clarify various problems concerned with *Hylophilus flavipes*. Typical *H. f. flavipes* Lafresnaye, named from Bogotá skins, ranges widely through tropical Colombia, while the birds of Venezuela have been listed as *Hylophilus flavipes acuticaudus* Lawrence. Certain specimens of a yellowish cast from Villavicencio, Meta, near the eastern base of the eastern Andean range have been carried as true *flavipes* for many years without arousing comment, and more recently similar specimens that came to the Phelps Collection from southwestern Venezuela were placed under the same name. Our present studies, based on long series of specimens, show clearly that true *flavipes* does not cross the eastern Andes of Colombia, and that there is a group between it and *acuticaudus* over a considerable geographic area that needs to be named. The deeper coloration of this new form has come especially to attention in skins secured recently in southern Táchira.

Intergradation with *acuticaudus* appears in the general region of western Estado Carabobo. We have a long series of skins that represent this race that cover northeastern Venezuela south to northern Bolívar. Lawrence's type specimen agrees with skins from the Caracas area, so that Todd's designation of the restricted type locality to Puerto La Cruz, Aragua, seems reasonable. Several skins examined from Margarita Island appear to agree with our series from the Venezuelan mainland.

FAMILY THRAUPIDAE.

Hemispingus melanotis melanotis (Selater)

Chlorospingus melanotis Selater, Proc. Zool. Soc. London, 1854 (April, 1855), p. 157, pl. 68 ("Bogotá", Colombia.)

Two specimens, male and female collected January 30 and February 7, 1955, in forest at 1800 meters altitude on the Hacienda La Providencia, Río Chiquito, Táchira, constitute the first record for Venezuela. In size and color these skins come clearly within the individual variation found in a small series of the typical race, described originally from Bogotá trade skins, and known to range in the subtropical zone of the Central and Eastern Andes, extending south into eastern Ecuador. The bird has not been reported previously north of the Bogotá region in Cundinamarca where it is known from the vicinity of Fusugasugá and Choachí, so that the two from the Río Chiquito mark a considerable extension of range to the north.

PROCEEDINGS
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SCIURUS NIGER CINEREUS LINNE NEOTYPE
DESIGNATION

BY FREDERICK S. BARKALOW, JR.

North Carolina State College, Raleigh, N. C.

The vague original descriptions without type designations have, as Osgood (1928) expressed it, "... tried the souls of conscientious taxonomists for years." Dr. Osgood might also have added that the failure of later revisors to designate a lectotype or neotype in the absence of the holotype has in many instances resulted in a proliferation of synonyms, each necessitating a laborious disposal process by subsequent workers.

The expansion or contraction of a species' range, which results either from environmental change or from intentional movements by man, appears to increase the desirability of designation of a specimen which can be considered typical of a named original population. This is particularly important in the case of game animals where indiscriminate transplanting may result in hybrid populations bearing little resemblance to the original stock. As an aid to the worker interested in studying the phenotypic effects of such introductions on the original populations, it would appear essential to have a standard for comparison.

The gradual attrition of the habitable range of the fox squirrel, *Sciurus niger cinereus* Linne, and the precarious existence of the remnant population on the Eastern Shore of Maryland (Mansueti, 1952) indicate the desirability for designating a neotype from this distinct population. Much of the confusion regarding the correct name for this form could perhaps have been avoided had a neotype been designated by one of the early revisors of this group. The taxonomic status of the name *Sciurus niger cinereus* Linnaeus has been treated in an earlier paper (Barkalow, 1954). There was, of course, no holotype designated by Linnaeus; there does not appear to be any specimens in existence which served as the basis for Linnaeus' description. Both the Linnaean Society of London and the British Museum of Natural History were contacted in efforts to locate any existing material.

Neotype No. 58158, University of Michigan Museum of Zoology, Mammal Collection: ♀ adult, skin and skull, Cambridge, Dorchester County, Maryland; collected 13 November 1926 by Ralph W. Jackson; original number 327. (Fig. 1).

Description of the neotype: Extreme tip of muzzle white, ears Cinnamon-Buff (Ridgeway, 1912), cheeks and eye ring Pinkish Buff. Top of head with indistinct whitish blaze. Dorsal portion of back a

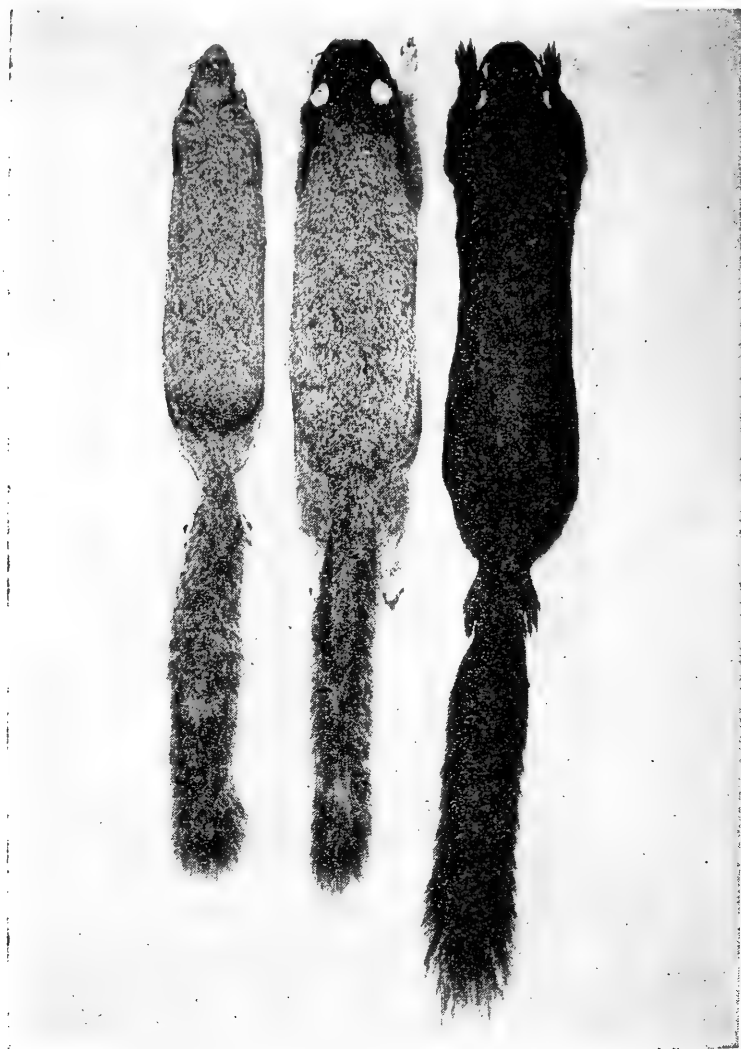


Figure 1

Left to Right: *Sciurus n. cinereus* (neotype) Cambridge, Dorchester Co., Maryland, (Univ. Mich. #58158); *Sciurus n. niger* (gray-white phase), West of McClellansville, Berkeley Co., South Carolina (U.S. Nat. Mus. #270147); *Sciurus n. niger* (melanistic), Wadmelow Island, Charleston Co., South Carolina (Charleston Mus. #37.207).

Deep Gull Gray effect, dorsal areas of feet and toes a Pinkish Buff with a few black-tipped hairs on the hind feet at the base of the toes. Belly white, mid-ventral portion of tail between Pinkish Buff and Cinnamon-Buff, tips of tail hairs white. Distinct subterminal black band around tail, uninterrupted at tip when viewed from ventral side.

Measurements: Neotype (adult ♀) Total length, 599; tail vertebrae, 285; hind foot, 74; skull—greatest length, 67.0; basilar length, 53.0; palatal length, 30.0; zygomatic breadth, 38.0; maxillary tooth row (alveolar), 12.0; nasal length, 23.6; interorbital constriction, 19.5; postorbital constriction, 19.8; postorbital process width, 29.7; rostral depth, 14.2. Measurements on all specimens examined are given in Table 1.

Characters: Similar to *Sciurus niger niger*, but slightly smaller. Coloration almost identical with the gray-white phase of *niger*, except the black hood, always found in *niger*, is absent in *cinereus*. The combination of a white muzzle and white ears invariably found in *niger* is usually absent in *cinereus*. Partial or complete melanism is unusual in *cinereus*, quite in contrast to the frequency of its occurrence in *niger*. Belly white, varying to Pale Gull Gray on an occasional individual. Mid-ventral portion of tail usually varying from white to Pinkish Buff, never a darker hue than Cinnamon-Buff. Tips of tail hairs usually white, but occasionally as dark as Pinkish-Buff. Back covered with black-tipped, white-banded hairs giving a uniform salt-and-pepper effect which varies in intensity from a Deep Gull Gray to a Slate-Gray. Ears and cheeks usually vary from Pale Gull Gray to a tone between Pinkish Buff and Cinnamon-Buff. No specimens were examined with a tone darker than Cinnamon-Buff on either the ears or the cheeks. Pinkish Buff ears and cheeks, particularly in the summer pelage, seem to be the most typical. The eye ring is never darker than Pinkish Buff. Dorsal portion of feet, when whitish, vary from Pale Gull Gray to Slate-Gray, and, when colored, may be as dark as Pinkish Buff. The presence of black-tipped hairs on the dorsal portion of the feet is a matter of individual variation in all the subspecies of *Sciurus niger*. In *cinereus*, black tips on the foot hairs may be completely absent, although on some non-melanistic individuals as high as 50 per cent of the foot hairs present may be black-tipped. In partially melanistic specimens, the tips of the majority of ventral guard hairs may be black-tipped.

Specimens examined, 30, as follows: Maryland, Dorchester County, 23; Talbot County, 1; "Eastern Shore," 2; Pennsylvania, Dauphin County, 1; Lower Brandywine Valley, 1; (?) Lancaster County, 2 (*cinereus x vulpinus*).

Original distribution: Probably throughout the peninsula of Delaware and the Eastern Shore of Maryland and Virginia. Two specimens in the Philadelphia Academy of Science believed by Poole (1944) to have been taken near Lancaster, Pennsylvania, are integrades which approach *cinereus*. Another in the Philadelphia Academy collection, which, according to Poole, was taken within twenty miles of Wilmington, Delaware, appears to be typically *cinereus*. A specimen in the Reading Public Museum and Art Gallery from Dauphin County, Pennsylvania, is typically *cinereus*.

Present distribution: Dozier and Hall (1944) give its present dis-

TABLE I.
Measurements of *Sciurus niger cinereus* Linne

		Total Length	Tail Vertebrae	Hind Foot	Greatest Length Skull	Basilar Length	Palatal Length	Zygomatic Breadth	Maxillary Tooth Row (Alveolar)	Nasal Length	Interorbital Constriction	Postorbital Constriction	Postorbital Process Width	Rostral Depth
No. Specimens		20	20	20	9	9	9	9	10	9	10	10	7	9
Mean		579.7	275.4	74.6	67.64	53.34	30.72	38.46	12.04	23.48	19.74	20.58	30.44	14.08
Maximum		617	307	80	68.8	54.5	31.3	39.6	12.6	24.0	20.2	21.2	31.8	14.7
Minimum		550	255	71	66.1	52.5	29.9	36.7	11.5	22.5	18.9	20.0	29.2	13.7
Standard Error (\pm)		17.6	12.6	3.3	.88	.64	.47	.96	.30	.45	.36	.47	.78	.34
No. Specimens		16	16	17	12	12	13	12	13	13	13	12	11	13
Mean		584.3	282.4	74.3	66.94	52.34	29.96	37.92	12.06	22.69	19.78	20.41	29.54	13.90
Maximum		606	305	81	68.6	55.2	31.6	39.5	12.7	24.8	21.4	21.9	32.4	14.6
Minimum		550	259	68	63.7	49.4	29.5	37.0	11.5	21.3	18.3	19.2	27.6	13.5
Standard Error (\pm)		17.7	13.6	3.6	1.32	1.57	.89	.80	.37	.88	.86	.85	1.26	.32

MALES

FEMALES

tribution in Maryland as Queen Anne, Talbot, Wicomico, Somerset, Worcester, and Dorchester Counties. It has apparently been extirpated in Virginia, Delaware, and Pennsylvania.

Acknowledgments: The author wishes to express his sincere appreciation to the following individuals and museums for their kindness in lending material for study: Dr. W. H. Burt, University of Michigan, Museum of Zoology; Dr. David H. Johnson, United States National Museum; Dr. E. Raymond Hall, University of Kansas, Museum of Natural History; Dr. Earl L. Poole, The Reading Public Museum and Art Gallery; Dr. Albert Schwartz, The Charleston Museum; Dr. Frederick A. Ulmer, Jr., The Academy of Natural Sciences of Philadelphia; and, Mr. Stanley P. Young, United States Fish and Wildlife Service.

LITERATURE CITED

- Barkalow, F. S., Jr. The status of the names *Sciurus niger cinereus* Linnaeus and *Sciurus niger vulpinus* Gmelin. Journ. Elisha Mitchell Sci. Soc., *Baltimore*, vol. 70, no. 1, pp. 19-26, illus., 1954.
- Dozier, H. L., and Harold E. Hall. Observations on the Bryant fox squirrel. Maryland Conservationist, *Baltimore*, vol. 21, no. 1, pp. 2-7, illus., 1944.
- Mansueti, Romeo. Comments on the fox squirrels of Maryland. Maryland Naturalist, *Baltimore*, vol. 22, nos. 3 and 4, pp. 30-41, 1952.
- Osgood, Wilfred H. Why is a type specimen? Journ. Mamm., *Baltimore*, vol. 9, no. 1, pp. 52-56, 1928.
- Poole, Earl L. The technical names of the northeastern fox squirrels. Journ. Mamm., *Baltimore*, vol. 25, no. 3, pp. 315-317, 1944.
- Ridgeway, Robert. Color standards and color nomenclature. The author, *Washington*, 2nd ed., 52 pp., illus., 1912.

PROCEEDINGS
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FIVE NEW THRIPS FROM THE SOUTHWEST
(THYSANOPTERA: TUBULIFERA)

BY LEWIS J. STANNARD, JR.
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Several of the new species described herein were collected by colleagues of Dr. Federico Bonet of Mexico City, who, in turn sent them on to me. The remaining species were taken by Dr. C. C. Hoff of Albuquerque and Dr. G. F. Knowlton of Logan, Utah. To these zoologists I express my appreciation for making the following thrips available for study. I am indebted also to Miss Kellie O'Neill for the loan of specimens and for helpful information on *Haplothrips* and its relatives.

The types of each species are deposited in the Illinois Natural History Survey.

***Adraneothrips* Hood**

In erecting this genus, Hood originally related it to *Haplothrips*. If, as Hood contends, *Adraneothrips* is allied to *Haplothrips*, the relationship must be a distant one. As the name implies, *Adraneothrips* is a genus of degenerate or "feeble" thrips. Unlike *Haplothrips*, the praepectal plates are lost, portions of the thoracic sternal sclerites are fractured into tiny platelets, and the wings are more fragile. Like a possibly closer ally, *Cephalothrips*, which also lacks praepectal plates, the eyes of species of *Adraneothrips* are frequently prolonged posteriorly on the ventral surface of the head and the intermediate antennal segments are usually bicolored. Unlike *Cephalothrips*, species of *Adraneothrips*, with the exception of *microsetis* and *bellus*, have all of the major prothoracic setae well developed. Actually the genus *Adraneothrips* is difficult to characterize and its species are sometimes even difficult to recognize as members. Much taxonomic work still remains to be done on this group.

There follow descriptions of four new species from an area, the Upper Sonoran Life Zone, where few *Adraneothrips* have been known. Three of these species are unusual in that they are either apterous or brachypterous. Except for *stenocephalus* Hood and *microsetis* Hood every other previously described species has been fully winged.

***Adraneothrips faustus* new species**

Male (brachypterous).—Length, distended exclusive of the antennae and setae, about 1.5 mm. Color uniformly dark brown except apical half of each tibia and all of each tarsus and the extreme base of anten-

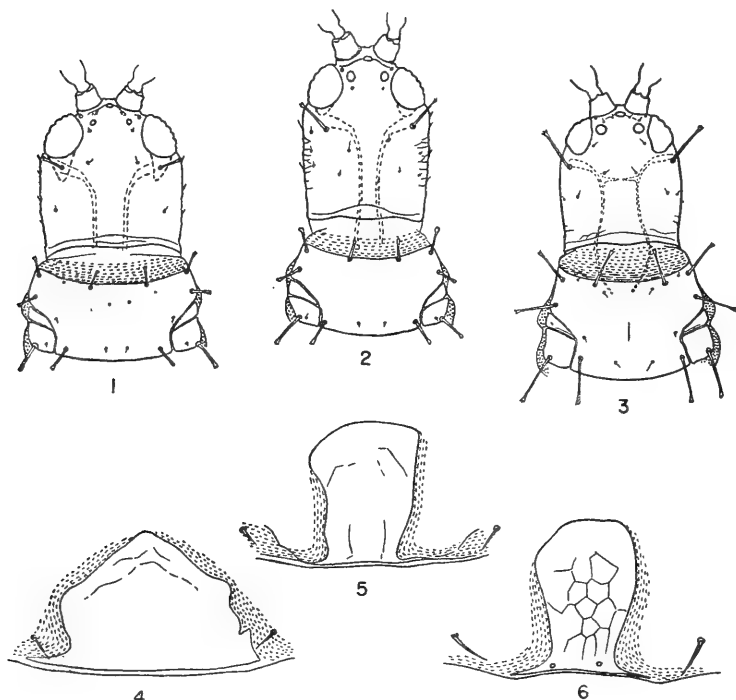
nal segment III which are yellow. Base of antennal segment IV light brown.

Head elongate, fig. 2; eyes ventrally prolonged slightly posteriorly beyond the posterior dorsal margins; antennal segment III seemingly with only one outer sense cone.

Prothorax with all major setae well developed and dilated at tips. Both fore and hind wing pads present, reaching nearly to the posterior margin of the metathorax, beginning to approach the micropterous condition.

Pelta, fig. 5, without pores, longer than wide; abdominal sternum VIII without glandular area.

Holotype.—Male; Imperial Bay, California; February 1, 1949; (C. Tellez); presumably from ground litter and separated by means of a Berlese funnel.



Explanation of Figures

Dorsal aspect of head and prothorax: fig. 1. *Adraneothrips vacuus*; fig. 2. *Adraneothrips faustus*; fig. 3. *Haplothrips* (*Xylaplothrips*) *sonorensis*.

Pelta (differentiated shield on abdominal tergum I): fig. 4 *Adraneothrips hoffi*; fig. 5. *Adraneothrips faustus*; fig. 6. *Adraneothrips ephippium*.

The only other species belonging to *Adraneothrips* which is also brachypterous is *stenocephalus*. Since *stenocephalus* is known solely from the female sex and *faustus* is here described from a single male specimen, these two species cannot be compared fully. However, the color and certain features of each are so distinctive that there is no possibility of confusing them. In color *faustus* is nearly uniformly brown whereas *stenocephalus* has much yellow on the basal abdominal segments. Pelta pores are present in individuals of *stenocephalus*; by contrast *faustus* lacks such pores. Furthermore the head of *stenocephalus* is proportionately longer than in *faustus* (compare fig. 2 with Hood, 1950, fig. 91).

***Adraneothrips vacuus* new species**

Female (apterous).—Length, distended, exclusive of the antennae and setae, slightly more than 1.2 mm. Bicolored brown and yellow. Brown: head; prothorax (light brown); mid-portion of abdominal tergum VII (light brown); sometimes lightly on sides of abdominal segments III and IV; abdominal segments VIII, IX, X; antennal segments I and II, apex of segment III, apical half of IV, V, and VI, and all of VII and VIII. Rest of body yellow with much red subintegumental pigments around the margins.

Head, fig. 1, moderately short; eyes considerably prolonged posteriorly on the ventral surface of the head; ocelli present but reduced in size; antennal segment III with one outer sense cone.

Prothorax with all major setae present, subequal in length, and each one dilated at tip; wings seemingly entirely absent, not even pads present.

Abdomen with pelta wider than long as in fig. 4, without pores; wing holding setae reduced, straight and spinelike, not sigmoidal.

Male (apterous).—Length, distended, exclusive of the antennae and setae, about 1 mm. Color and structure generally similar to female; abdominal sternum VIII with a small, nearly circular to elongate oval, median glandular area; lateral pair of setae on posterior abdominal tergum VIII reduced and spinelike.

Holotype.—Female; Hollywood, California; January 16, 1949; (C. Tellez). *Allotype*.—Male; same data as for holotype; 2 ♀, 2 ♂; Santa Cruz Island, California; January 27, 1949; (F. Taylor). All are presumed to be from ground litter from which they were separated by means of a Berlese funnel.

Apterism in the genus *Adraneothrips* is unusual. Besides this species and the closely related *hoffi*, the only other species that is also apterous is *microsetis* from Peru. The species *microsetis* is mostly dark brown and is in sharp contrast to the bicolored yellow and brown *vacuus* and *hoffi* and therefore can be easily distinguished on color as well as other differences. The species *hoffi* can be differentiated from *vacuus* by the features mentioned in the discussion following the description of *hoffi*. Actually, the color of abdominal tergum VIII is sufficient to distinguish *vacuus* from *hoffi* at a glance. In *vacuus* this tergal plate is brown whereas in *hoffi* it is bright yellow.

***Adraneothrips hoffi* new species**

Female (apterous).—Length, distended exclusive of the antennae and setae, about 1.4 mm. Bicolored brown and yellow. Brown: sides of and

apex of head, antennal segments I and II, apices of III, IV, V, and VI, and all of segments VII and VIII; and abdominal segments IX and X. Rest of body yellow with much red subintegumental pigments around the margins.

Head similar to fig. 1; eyes considerably prolonged posteriorly on the ventral surface of the head; ocelli absent; antennal segment III with two outer sense cones.

Prothorax with all major setae present, subequal in length, and each one dilated at tip; wings seemingly entirely absent, not even pads present.

Abdomen with pelta wider than long, fig. 4, without pores; wing holding setae reduced, straight and spinelike, not sigmoidal.

Male (apterous).—Length, distended, exclusive of the antennae and setae, slightly more than 1 mm. Similar to the female in color and general structure; glandular area on abdominal sternite VIII slightly more oval (wider) than the area found in males of *vacuus*.

Holotype.—Female; Cole Springs, Sandia Mountains, Bernalillo Co., New Mexico; July 21, 1951; (C. C. Hoff); ex: Acorn hulls in squirrel's cache. *Allotype*.—Male; same data as for holotype. *Paratype*.—11 ♀; same data as for holotype; 5 ♀, 7 ♂; Chamisos Canyon in the Manzano Mountains (10 miles east of Albuquerque), Bernalillo Co., New Mexico; April 2, 1950; (C. C. Hoff); ground litter from almost pure stand of scrub oak.

The light color of *hoffi* is not due to possible teneral conditions but rather is the ultimate color. In the type series there are several females each bearing a fully developed egg within the abdomen and the foregoing color description was made from these mature individuals.

The New Mexican *hoffi* is most closely related to its southern Californian neighbor *vacuus*. Besides being slightly longer in size, *hoffi* is lighter in color than *vacuus*, and, unlike *vacuus*, antennal segment III bears two outer sense cones. Because of the total lack of ocelli *hoffi* is considered to be more specialized (by degeneracy) than *vacuus*.

Lack of ocelli is unusual in this genus. The Peruvian *microsetis* is the only other species in *Adraneothrips* which is characterized by the lack of ocelli. In addition to color characteristics, *hoffi* can be distinguished from *microsetis* by the form of the anterior prothoracic setae. In *hoffi* (as well as in the near related *vacuus*) these setae are well developed and dilated at the tips; in *microsetis* the anteromarginals are vestigial and the anterolaterals are pointed at the tips.

Adraneothrips ephippium new species

Female (macropterous).—Length, distended, exclusive of the antennae and setae, about 1.5 mm. Color predominantly brown, interrupted by yellow. Yellow: base of antennal segments III, IV, V, and VI; fore and hind tibiae, apex of mid tibiae; all tarsi; and abdominal segments II, VI, and VII. Rest of body brown; abdominal segments III, IV, and V lighter brown; much of body with red subintegumental pigments. Fore wings with a pale brown, subbasal band.

Head similar in shape to *vacuus*, fig. 1; ocelli well developed; eyes ventrally prolonged more than the dorsal posterior margin; antennal segment III with but one outer sense cone.

Prothorax with all major setae present, subequal in length, and each one dilated at tip; fore wings, each with three accessory fringe cilia.

Abdominal segment I with pelta as in fig. 6, longer than wide and with pores; tube much more than one half as long as head.

Holotype.—Female; La Jolla, California; December 15, 1948; (C. Tellez); presumably from ground litter and recovered by means of a Berlese funnel.

This western species resembles the southeastern *decorus* Hood in many ways except in color and in the structure of the eyes. In color *decorus* is lighter with more yellow in the body than in *ephippium*. In *decorus* the eyes are hardly at all prolonged on the ventral surface whereas in *ephippium* the eyes are decidedly prolonged ventrally.

Haplothrips subgenus *Xylaplothrips* Priesner

The rank of *Xylaplothrips*, either as a subgenus or genus or merely a species complex, is a point of controversy among thysanopterists. At the moment, I shall consider it a subgenus of *Haplothrips* differing little from *Haplothrips* s. str. and differing little from *Karnyothrips* which is also more properly a subgenus of *Haplothrips*.

As Priesner pointed out in 1939, the placement of the fore tarsal tooth is diagnostic. In individuals assignable to *Xylaplothrips* the fore tarsal tooth is located at the extreme apex of each segment, not subapically as in most species of *Haplothrips* s. str. Besides this characteristic, *Xylaplothrips* can be differentiated from most species of the typical subgenus by the delicate, slender body form. Specimens of the typical subgenus are robust by comparison.

From *Karnyothrips*, *Xylaplothrips* can be distinguished usually by the length of certain prothoracic setae. In *Karnyothrips* the anteromarginal setae are minute and never as well developed as the anterolateral setae. In *Xylaplothrips* the anteromarginals are well developed and subequal in length to the anterolaterals.

Haplothrips (*Xylaplothrips*) *sonorensis* new species

Female (brachypterous).—Length distended, exclusive of the antennae and setae, slightly more than 1.4 mm. Color various shades of yellow and brown. Brown: antennal segments IV to VIII; median anterior spot on abdominal segments III to VII and sometimes VIII; and all of tube except extreme base. Yellow brown to brown: head; antennal segment I and sometimes III lightly; thorax; and rest of abdomen. Yellow: antennal segments II and occasionally III and legs. Red: ocellar crescents, and some subintegumental pigments.

Head, fig. 3; post ocular seta moderately long, dilated at tips; maxillary bridge slightly widened and conspicuous.

Prothorax with all major setae well developed and dilated at tips; praepectus present; fore tarsi, each with a minute, apical tooth; fore wings reduced to a small pad; hind wings seemingly absent, not even represented by a pad.

Adominal tergum II smooth, without sculpture; wing retaining setae reduced, spinelike, not sigmoidal; anal setae slightly less than twice as long as tube length.

Male (brachypterous).—Length distended, exclusive of the antennae and setae, slightly more than 1.2 mm. General color and structure simi-

lar to female. Abdominal sternum VIII without glandular area; abdominal tergum IX with posterior, lateral setae shortened and spinelike.

Holotype.—Female; Santa Cruz Island, California; January 27, 1949; (F. Taylor); presumably from ground litter from which it was recovered by means of a Berlese funnel. *Allotype*.—Male; same data as for holotype. *Paratypes*.—2 ♀, 1 ♂; Hollywood, California; January 16, 1949; (C. Tellez); presumably from ground litter.

Additional records.—IDAHO: 1 ♀; Franklin; March 19, 1949; (G. F. Knowlton and Shih-Chun Ma); ex: leaves of poplar and grasses. UTAH: 1 ♂; Garland; July 23, 1949; (G. F. K. and S. E. M.); ex: moldy poplar leaves. NEW MEXICO: 1 ♀; so. of Hatch; November 29, 1949; (C. C. Hoff); ex: rotten cottonwood stump along Rio Grande. 9 ♀; Bernalillo Co.; October 29, 1950; (C. C. Hoff); Juniper litter. 16 ♀, 1 ♂; Pumice Mine, no. of Grants, Valencia Co.; October 20, 1951; (C. C. Hoff); pinyon litter—Berlese sample.

In 1952 Miss O'Neill showed me several more specimens of this species taken from a rat's nest collected in Santa Fe, New Mexico by Dr. H. B. Morlan. These specimens are kept in the collections of the United States National Museum.

This species is the western counterpart of the eastern *americanus*. The two may be easily distinguished from each other by color, especially the color of antennal segments II and III. Individuals of *sonorensis* have these segments yellowish, whereas individuals of *americanus* have the segments brown. Except for teneral specimens, *americanus* is a dark brown insect in contrast to *sonorensis* which is a yellowish brown insect.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DISTINCTION OF MARITIME AND PRAIRIE
POPULATIONS OF BLUE-WINGED TEAL

BY ROBERT E. STEWART AND JOHN W. ALDRICH
*Fish and Wildlife Service, Laurel, Maryland
and Washington, D. C.*

In the course of waterfowl food habits investigations by the senior author, a number of breeding specimens of Blue-winged Teal, *Anas discors*, were collected in the Chesapeake Bay marshes. Routine comparison of these with breeding specimens from the West showed a marked difference in the color of the two series. The eastern birds stood out as being much darker. All breeding specimens in the National collections were then assembled and additional material borrowed from other museums. For courteous cooperation in this connection we are indebted to officials of: Museum of Comparative Zoology, Cambridge; Royal Ontario Museum of Zoology, Toronto; Museum of Zoology, University of Michigan; American Museum of Natural History, New York; Carnegie Museum, Pittsburgh; and Chicago Natural History Museum.

Only specimens collected between May 25 and July 31 were used in the comparisons in order to be reasonably sure that no migrants would be included. In sorting the breeding specimens it becomes apparent that the extremely dark birds are all from the Atlantic seaboard, but that some specimens from the far north approach them in color. In fact two examples from James Bay, Ontario, in the Carnegie Museum collection are almost as dark as the Maryland extremes. A male specimen in the Fish and Wildlife Service collection from Egg Lake, Athabaska Delta, Alberta, approaches the eastern type, but two females in the same collection from Main Branch of Athabaska Delta, Alberta, are typical western birds. A female specimen in the Chicago Natural History Museum collection, taken at Many Island Lake in southeastern Alberta, is darker than most prairie specimens of the western race but is not as dark as typical eastern birds. A female specimen in the University of Michigan collection from North Manitou, Leelanau County, Michigan, is darker than most western birds but not as dark as typical eastern examples from the Atlantic coast. Two male specimens in the Royal Ontario Museum of Zoology, taken at The Pas, Manitoba, are intermediate between eastern and western forms; the one taken at Root Lake is closer to the eastern form and the one from Brook, nearer the western. Although these few specimens from the vicinity of the northern Great Lakes in Michigan and portions of the Prairie Provinces of

Canada show a tendency to darkness that might be considered as indicating intermediacy between dark and light populations, the large majority of specimens of both sexes from localities west and south of these points are light colored, and those from the natural grassland and desert areas of the Great Plains and Great Basin are almost without exception very much paler than the Atlantic seaboard series.

"Migrant" specimens (those collected between August 1 and May 24) were grouped on the basis of whether they were more closely identifiable with the Atlantic coast or the prairie breeding series. The great majority of these from all parts of the range are of the pale, prairie coloration. However, dark birds referable to the Maritime populations can be found scattered among migrant specimens from a wide range, extending from Montana and Texas to the Atlantic coast and south to South America.

It is concluded on the basis of marked color differences and apparent geographical segregation during the breeding season that two recognizable races of blue-winged teal exist which are sufficiently distinct to warrant application of different subspecific names. Two questions immediately present themselves: What names have already been proposed for this species; and to which of the two races do they apply?

The name *Anas discors* Linnaeus has been restricted by the Committee on Classification and Nomenclature of the American Ornithologist's Union (1931:48) as referring to the blue-winged teal found in South Carolina. This is based on the conclusion that Linnaeus (1766:205) was influenced in his description of this species primarily by Catesby's (1731:100) description of the "white-faced teal," and that Catesby's experience with this species was most likely in South Carolina. As far as we know this species does not breed in South Carolina so Catesby's experience must have been with migrant birds. Review of all migrant specimens at our disposal disclosed two from South Carolina, both of which are of the pale, prairie type. In fact most of the migrant specimens seen from the Atlantic seaboard are of this form. It is well known that the prairie populations are very much higher than those of the Atlantic seaboard and the northern fringe of the range; also that these prairie birds migrate largely in a southeasterly direction through the southern Atlantic states (Stoudt, 1949:91). Furthermore, field observations and collecting indicate that at least part of the dark, coastal breeding population (that of Dorchester County, Maryland) is largely permanently resident. Thus it seems far more likely that Catesby had a migrant example of the interior breeding population in hand when he described and figured his "white faced teal." If any weight can be attached to the plate itself it may be stated that it does suggest the light-colored western birds. For these reasons the name *Anas discors* is still further restricted to the pale-colored population which breeds in the western prairie, plains and basin country of western North America, and migrates through South Carolina and other southern Atlantic states on its way to and from the West Indies and South America.

The next problem to be disposed of is the application of the name *Querquedula discors albinucha* Kennard (1919:459) which was originally applied to birds with excessive amounts of white on the head, collected in southern Louisiana marshes. In the first place it was verified from evidence presented by numerous specimens, representing all

parts of the range of the species, that the extension of white on the head above the eye and to the nape of the neck has no geographic significance. This has been pointed out by Arthur (1920:127) and subsequent writers. The specimens, including the type, on which the description of *albinucha* is based, are all from Cameron Parish, Louisiana. The species is said to breed in Cameron Parish as well as elsewhere in Louisiana (Oberholser, 1938:117). Whether or not any of the type series were actually breeding birds cannot be determined from the dates or other information given by Kennard (1919) in the original description. The type specimen itself, collected as early as April 2, is certainly doubtful in this respect. Of the type series borrowed from the Museum of Comparative Zoology, May 18 was the latest date of collection and this is outside of safe limits for considering birds as definitely breeding. Of the type series of 10 specimens, only one, a male taken May 6, 1919, in Cameron Parish, Louisiana, seems to fall within the range of coloration of the dark eastern form. The remainder (including the type, kindly made available to us by Mr. James Greenway of the Museum of Comparative Zoology) were of the pale western coloration. Thus, *Querquedula discors albinucha* Kennard is a synonym of *Anas discors* Linnaeus.

A search of the literature fails to reveal any other name which has been used for this species. Thus the dark eastern and northern population seems to be without a name, and we therefore name and characterize it as follows:

***Anas discors orphna*, subsp. nov.**

Atlantic Blue-winged Teal

Subspecific characters.—Similar to *Anas discors discors* of the interior grassland and desert regions of North America but (in male) upper parts darker, black areas of feathers of back, rump, upper tail coverts, and upper surfaces of rectrices and primaries more intensely black; head and neck darker gray; crown, chin and border of white crescent more intensely black (less brownish); under parts darker, black spots and barring deeper black (less brownish); reddish brown markings deeper in tone; under tail coverts more intensely black; under surface of rectrices and primaries darker (less silvery) gray. In females: Upper parts darker, especially crown on which light edgings tend to be absent; dark areas of crown, back of neck, back, upper tail coverts, rectrices and primaries more intensely black (less brownish); under parts somewhat darker with dark areas of plumage more intensely black.

Measurements.—Adult male (8 breeding specimens): Wing (chord of unstraightened wing), 180-193 (Average, 186.06 mm.); tail 61-69.5 (66.44); exposed culmen, 35-43.5 (41.06); tarsus, 30.5-34.5 (32.12); middle toe without claw, 34.5-39 (37.00). Adult female (3 breeding specimens): Wing, 168.5-180 (173.16); tail, 59.5-65.5 (63.33); exposed culmen, 39-41.5 (40.00); tarsus, 30.5-33 (31.5); middle toe without claw, 33-36.5 (34.5).

There appears to be no consistent size difference in these two races since average measurements of the male of *orphna* are larger and the female smaller in most characters than *discors*. Measurements of *discors* are given here for comparison. Adult male (25 breeding specimens): Wing, 173-193 (181.88 mm.); tail 59.5-71.5 (64.56); exposed culmen

32.5-42 (39.86); tarsus, 30-35 (32.22); middle toe without claw, 31-38 (35.22). Adult female (15 breeding specimens): Wing, 167-183 (174.53); tail, 59.5-70 (64.03); exposed culmen, 37-40 (38.87); tarsus 30-33 (31.43); middle toe without claw, 30.5-36 (34.13).

Type specimen.—No. 458061 U. S. National Museum (Fish and Wildlife Service Collection); adult ♂; collected at Elliott, Dorchester County, Maryland, June 9, 1954, by R. E. Stewart and W. R. Nicholson.

Geographic distribution.—Breeds in salt or brackish tidal marshes along Atlantic seaboard from northeastern North Carolina (Pea Island, *fide* R. E. Griffith), north to northeastern Massachusetts (Newburyport); also breeds in New Brunswick, Nova Scotia and Prince Edward Island (*fide* C. E. Addy); and occurs during the breeding season at Nattabisha Point and Moose Factory, Ontario (specimens in Carnegie Museum).

Integrates with *discors* in the Great Lakes region and in central Canada. At least as far west as western Manitoba and northeastern Alberta some influence is noted. Apparently the center of abundance of the breeding population is in the brackish tidal marshes of New Jersey, Delaware and Maryland, particularly in the Chesapeake Bay marshes of Dorchester County, Maryland and in the Delaware Bay marshes of Delaware and New Jersey.

Migrates southward to the West Indies and South America. At least part of the middle Atlantic coastal population seems to be permanently resident.

Habitat.—During the breeding season in Maryland, Delaware and New Jersey, this form is largely restricted to brackish tidal marshes in which salt-meadow grass (*Spartina patens*) is prevalent. In life form this type is similar to the fresh marsh-meadows in which breeding birds of the interior race are found.

Specimens identified.—*Anas discors orphna*. CANADA: Ontario—Moose Factory, May 19, 1930; Nattabisha Point, James Bay, June 26, 1912 (2). COLOMBIA: Cali, March 25, 1949. CUBA: Las Villas, Laguna Guanaroca, March 10, 1948. UNITED STATES: Florida—Immokalee, April 12, 1919; Lake Harney, March 21, 1896. Louisiana—Cameron, May 6, 1919. Maryland—Blackwater Refuge, May 22, 1931; Elliott, June 8, (4) and June 9, 1954 (4), January 4, 1955; Oxen Hill, April 16, 1934. Massachusetts—Cambridge, June 8, 1868. Michigan—Beaver Island, May 23, 1932; Grand Rapids, September 1, 1891. Mississippi—Bay St. Louis, April 14, 1902 (2). Montana—Jordan, May 8, 1916. New Jersey—Princeton Texas—Henrietta, April 19, 1894. Virginia—Nelson County, April 11, 1902 (2).

Anas discors discors. CANADA: Alberta—Driedmeat Lake, June 6, 1945; Egg Lake, Athabaska Delta, July 3, 1920; Hay Lakes, June 8, 1945; Main Branch, Athabaska Delta, June 14, 1920, June 20, 1920; Many Island Lake, June 9, 1906; Tofield, Beaverhill Lake, May 20, 1922 (3), May 22, 1923. Manitoba—Brook near The Pas, June 9, 1945; Deer Lodge, May 10, 1930; Gypsumville, May 30, 1931; Lake St. Martin, May 21, 1934 (2); Lake Winnipegosis, June 5, 1913; Root Lake near The Pas, June 9, 1945; Sandy Bay, Lake Manitoba, June 19, 1895. Northwest Territories—Fort Resolution, Great Slave Lake, June 8, 1873, June 8, Ontario—Ashbridges Bay, Toronto, May 15, 1894; Hallowell, Prince Edward County, June 14, 1930; Keewatin, June 3, 1949;

Lake Ira, Bruce County, June 11, 1934; Syne Cartier, Wallaceburg, May 17, 1881; Turkey Point, Norfolk County, May 23, 1933 (2). Saskatchewan—Bigstiek Lake, June 26, 1907; Davidson, May 18, 1932; Maple Creek, July 3, 1906; Last Mountain Lake, June 13, 1932; Stalwart, June 16, 1932 (2); Whitemud—East End, May 21, 1939. COLOMBIA: Navarro, Feb. 24, 1949. MEXICO: Coahuila, Sept. 10, 1936. Michoacan—Huingo, July 17, 1904. Baja California—Gardiner's Laguna, Salton River, Apr. 21, 1894; San Jose, Feb., 1860 (2); Santo Lazaro Mts., Jan., 1860. Neuvo Leon, May 1853. Veracruz—Rivera, Apr. 12, 1904, Apr. 27, 1904. Tamaulipas—San Jose, Feb. 19, 1939; Sacutula Run, May 1863. GUATEMALA: Buenas, November 1861. UNITED STATES: Arizona—Big Lake, Apache Co., Aug. 4, 1914; Marsh Lake, June 14, 1915; Tucson, May 5, 1881. California—Dominquez Rancho, Sept. 14, 1915. Colorado—Clear Creek, May 23, 1873; Mill City, May 10, 1877. Delaware—Fowler's Beach, Apr. 29, 1932. District of Columbia—Potomac River, Apr. 1, 1899. Florida—Indian River, May 13, 1886; Lake Harney, Mar. 21, 1896; Lake Kissimmee, Mar. 22, 1901; St. Marks Light Station, Apr. 3, 1924; Wilson, Apr. 11, 1923. Illinois—Mt. Carmel, Apr. 16, 1874, May 10, 1878. Indiana—Wheatland, May 14, 1885. Iowa—New Sharon, Mar. 20, 1892; Chariton, May 12, 1872. Kansas—Lawrence, Oct. 14, 1905, Oct. 14, 1906. Louisiana—Belle Isle, Mar. 2, 1910; Cameron, April 2, May 6, 7 (2), May 8, May 9 (2), May 10 (2), May 11 and May 18, 1917; Morgan City, May 22, 1925. Maryland—Patuxent River (Marlboro), Sept. 10, 1937; Susquehanna Flats, Sept. 13, 1894. Massachusetts—Orleans, Apr. 5, 1894. Michigan—Beaver Island, May 23, 1932; Fish Point, Tuscola Co., June 15, 1926; North Manitou, Leelanau Co., June 19, 1940; Saginaw Co., May 16, 1934 (2). Minnesota—Fort Snelling, May 10, 1890, May 21, 1890, June 15, 1890. Mississippi—Bay St. Louis, Sept. 7, 1896, Oct. 12, 1901; Biloxi, Apr. 10, 1937 (2), Sept. 27, 1939. Missouri—, May 1856; Charleston, May 4, 1879 (2). Montana—Baker, May 24, 1916; Custer Co., May 25, 1886; Jordan, May 8, 1916; Lake Bowdoin, Oct. 7, 1915 (2); Lismas, June 24, 1919. Nebraska—Hackberry Lake, Cherry Co., July 10, 1933. Nevada—Blair, Sept. 23, 1915, Sept. 27, 1915 (2). New Mexico—Carrizozo, June 3, 1938; Las Cruces, May 20, 1920 (2); Riley, Sept. 25, 1905; Rio Arriba Co., July 30, 1913; Santa Rosa, Oct. 1, 1902. New York—Good Grounds, Long Island, May 5, 1882 (2). North Carolina—Asheville, Apr. 21, 1934; Bodie Island, May 1, 1905; Pisgah National Forest, Apr. 10, 1930; Portsmouth, Dec. 24, 1917. North Dakota—Blackmer, June 2, 1915; Grafton, May 16, 1930 (2); Lac aux Morts, Apr. 30, 1901, May 24, 1901, June 13, 1901, July 12, 1901; Lostwood, Aug. 17, 1915; Rocklake, May 6, 1895, May 7, 1895, May 27, 1895; Sweetwater Lake, May 19, 1902; Townner Co., May 16, 1890, May 12, 1895, May 25, 1895 (2); Upham, McHenry Co., Nov. 20, 1937. Oklahoma—Mt. Scott Post Office, Apr. 14, 1904. Oregon—Klamath Falls, Apr. 19, 1924. South Carolina—Santee Club, Dec. 20, 1909 (2), Dec. 22, 1909. South Dakota—Custer Co., May 2, 1922; Harrison, May 13, 1888, May 28, 1888, May 4, 1891. Tennessee—Reelfoot Lake, Sept. 6, 1937. Texas—Fort Stockton, Apr. 18, 1860; Ingram, June 5, 1915. Utah—Bear River, Aug. 28, 1914, Sept. 12, 1914, June 21, 1915, Oct. 16, 1916; Jensen, May 1, 1935. Virginia—Four Mile Run, Sept. 18, 1893 (2); Gainesville, Mar. 31, 1904; New River, Sept.

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23, 1939; Shenandoah National Park, Oct. 12, 1949. Wisconsin—Delavan, Oct. 6, 1908, Oct. 11, 1908, Nov. 7, 1908, Sept. 24, 1913; Viroqua, Vernon Co., Sept. 8, 1913. Wyoming—Douglas, May 2, 1891, May 2, 1894; Laramie, VENEZUELA: Cantaura, Oct. 5, 1947. CUBA: Guantanamo, Dec. 1910 (2); Pinar del Rio, Feb. 23, 1900 (2); HAITI: Etang Sumatre, Apr. 10, 1920 (2); Apr. 13, 1920; Las Basses, Jan. 9, 1918. JAMAICA: Great Salt Pond, Oct. 13, 1863; Spanishtown, Mar. 1863, Oct. 10, 1863 (2), and one with date unknown. LEEWARD ISLANDS: Montserrat, Foxes Bay, Sept. 18, 1937. VIRGIN ISLANDS: St. Croix, South Gate Pond, Nov. 10, 1934.

REFERENCES

- American Ornithologist's Union, Committee on Classification and Nomenclature, 1931—Check-List of North American Birds (4th ed.), Lancaster, Pa. xix, 526 pp.
- Arthur, S. C., 1920—A note on the southern teal. *Auk* 37:126-127. 1920
- Catesby, M., 1731—Natural History of Carolina, Florida and the Bahama Islands. London 1: i-xii, 100 pp.
- Kennard, F. H., 1919—Notes on a new subspecies of Blue-winged Teal. *Auk* 36:455-460.
- Linnaeus, C., 1766—Systema Naturae (12th ed.), 1:532 pp. 1766
- Oberholser, H. C., 1938—The Bird Life of Louisiana. Louisiana Department of Conservation Bull. 28: xii, 834 pp.
- 1938 of Conservation Bull. 28: xii, 834 pp.
- Stoudt, J. H., 1949—Migration of the Blue-winged Teal. Fish and Wildlife Service. Spec. Sci. Report, (Wildlife), 1:19-20.

PROCEEDINGS
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DESCRIPTIONS OF TWO NEW WESTERN *OXYBELUS*
(HYMENOPTERA: SPHECIDAE)

BY RICHARD M. BOHART AND EVERT I. SCHLINGER
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These species are described in order to validate their names for use in a comprehensive report on the *Oxybelus* of California. A key and figures will be given in the aforementioned report. Holotypes will be deposited in the California Academy of Sciences, paratypes in the University of California collections at Berkeley, Riverside, and Davis.

Oxybelus paracochise Bohart and Schlinger, new species

Diagnostic characters: Vertex with a shiny median tubercle, median cell of forewing extensively setose, mucro narrow and pointed, male penult tergite red and carinate sublaterally, fore tibia and femur red.

Male.—Length of body 8 mm., length of forewing 5 mm. Color, black with ivory and brownish-red markings. Pronotal lobe and lateral spot on pronotal margin, squamal membrane, lateral posterior spots on tergites I-IV, ivory. Mandible basally, tegula, fore femur mostly, fore tibia, apex of penult tergite and all of last abdominal segment, bright brownish-red. Eyes brown. Wing membrane transparent, veins dark brown. Pubescence moderate, silvery, fairly thick and yellowish-tinged on face, slight on mesopleuron. Puncturation moderate, close, rather fine on head and mesonotum, coarse on mesopleuron, postscutellum, and tergites I, VI, VII, fine and moderately close on other abdominal tergites.

Head with clypeal apex tridentate, middle tooth longitudinally carinate, not beak-like, frons at its narrowest point slightly wider than compound eye, ocellar tubercles moderately developed and punctate, temporal carina undeveloped.

Thorax with pronotal carina slightly broken at pronotal angle, otherwise strong; mesonotal groove absent; squamal point strong, slightly depressed, squamal margin nearly evenly incurved, the point somewhat more angled in; mucro tapering toward narrowly rounded apex, not emarginate, grooved throughout, slightly depressed on distal one-half, its median breadth about equal to diameter of mid ocellus, a little longer than squama; median carina low on scutellum, moderate on postscutellum; posterior area of propodeum faintly striate, finely punctate, areolate slightly above, enclosure nearly triangular, shiny, lateral area of propodeum mostly shiny, carinulate above, lateral carina strong throughout; forewing median cell with dense short setae on anterior one-third, remainder with fewer and longer setae; hind femur with strongly projecting, distal, lamellate keel.

Abdomen rather constricted between segments, lateral tooth short and weak on tergite III, strong on IV-VI; penult tergite carinate on posterior one-half dorsolaterally, pygidium wedge-shaped, narrow, bounded laterally by a carina.

Female.—Length of body 8 to 9 mm., length of forewing 6 to 7 mm. As described for male except as follows: Clypeal apex quinquedentate with median tooth smallest and surrounded by a shiny, bristled, longitudinal tubercle which is most pronounced opposite bases of antennal insertions. Pubescence of head relatively short and sparse. Mucro narrow, tapering to a point, not depressed distally, a little shorter than squama. No lateral tergal teeth or carina on penult tergite. Setae of pygidium, golden.

Holotype male: Sonoita, Arizona, August 9, 1940, on *Eriogonum* (P. H. Timberlake).

Paratypes: 1 male, Santa Elena Canyon, Big Bend National Park, Texas, 2145 feet, August 25, 1954 (R. M. Bohart); 1 female, Tucson, Arizona, 2400 feet, August 17, 1946 (H. A. Scullen); 1 female, Douglas, Arizona, August 22, 1935 (W. W. Jones); 4 males, Douglas, Arizona, August 8, 1955 (R. R. Dreisbach); 1 female, Apache, Arizona, 5000 ft., August 4, 1955 (R. R. Dreisbach).

The most closely related species appears to be *cochise* Pate from which it differs in its larger size, absence of yellow on the legs, reddish instead of dark penult tergite in the male, evenly colored antenna, and denser setation of the median cell on the posterior one-half. Another species of this group, *punctatum* Baker, has the radial cell nearly asetose as in *subcornutum* Cockerell, according to K. V. Krombein (in a letter, 1955), who compared the types. Superficially, *paracochise* resembles *cornutum* Robertson which, however, has shiny interocellar swellings and the distal keel of the hind femur weakly developed, among other characters.

***Oxybelus argypheum* Bohart and Schlinger, new species**

Diagnostic characters: Vertex without median tubercle, mucro nearly parallelsided, head, thorax and propodeum above with dense silvery pubescence; setae of median cell minute, squama with a well developed submedian lobe, fifth tergite of female with a distinct, apical silvery band of pubescence.

Female.—Length of body 7 mm., length of forewing 5 mm. Color, black with ivory and reddish markings. Spot on pedicel, pronotal collar and lobe, tegula, lateral scutellar spot, squama except outer margin, spots on mid and hind coxae, spots on all femora and tibiae, hind tibia externally, front tarsus, lateral spots on tergites I-III and thin sternal bands on I-IV, ivory. Antennal flagellum, mandible medially, compound eye, fore tibia mostly, mid and hind tibiae and tarsi partly, wing veins, light brown. Abdominal segments III-VI with rusty ground color. Mandible on basal and distal one-third, scape and pedicel mostly, mid and hind tibiae partly, sternites I and II, tergite I medially, dark brown. Wing membrane transparent, somewhat milky, brown-stained only along distal costal margin of forewing. Pubescence rather coarse, silvery and dense on body including legs except vertical plane of pronotum, inner leg surface, propodeum laterally, sternites III-IV. Pubescence forming

prominent silvery apical bands on tergites I-V. Punctuation moderate on head and thorax, fine on abdominal tergites, sternites mostly smooth.

Head with clypeal apex quinque-dentate, only most lateral tooth prominent; a weak longitudinal clypeal carina obscured by pubescence; frons at its narrowest point about 1.5 times wider than compound eye, no temporal carina.

Thorax with pronotal carina broken at pronotal angle, weak beyond; no mesonotal groove; squamal point depressed, incurved, extending about as far as well-developed submedian lobe, postscutellum nearly 3 times as wide as long; mucro deeply grooved, sides nearly parallel, apex slightly emarginate, median breadth a little less than diameter of mid ocellus (somewhat broader in paratypes), about 1.3 times longer than squama; scutellum with a faint median carina, postscutellum depressed medially, not carinate; posterior area of propodeum faintly striate, enclosure smooth below, poorly defined, lateral area of propodeum mostly smooth and shiny, lateral carina weak, traversed by several oblique carinulae; median cell of forewing with pale setae evenly dispersed along anterior one-third, inconspicuous elsewhere; hind femur with minute distal carina. Abdomen not obviously constricted between segments.

Holotype female: Borego, San Diego County, California, April 27, 1954, on *Croton californicus* (M. Wasbauer).

Paratypes: 1 female, same data as holotype but collected April 30, 1954; 1 female, 6 miles west of Indio, Riverside County, April 30, 1949, on *Melilotus* (E. G. Linsley, J. W. MacSwain, R. F. Smith); 1 female, Twenty-nine Palms, San Bernardino County, California, April 13, 1935, on *Salix nigra* (P. H. Timberlake).

This species is closely related to *robertsoni* Baker but differs markedly in the coarser and much denser silvery pubescence. The silvery band on tergite V is not present on *robertsoni*. We have seen a male from Lone Pine, Inyo County, California, May 2, 1937 (E. C. Van Dyke) which may be this species. However, it is not quite so silvery and lacks a definite band on tergite V. Therefore, it may be *robertsoni*. Superficially, *argypheum* resembles *townsendi* Cockerell and Baker because of the pubescence. It is easily distinguished by the well-developed submedian squamal lobe.

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GENERIC NAMES IN THE FAMILY PLATYRHACIDAE
AND THEIR TYPE SPECIES, WITH A CONSIDERA-
TION OF THE STATUS OF *STENONIA* GRAY, 1842

BY RICHARD L. HOFFMAN

Although the number of students of the Diplopoda has been small, and these investigators generally competent zoologists, the nomenclature in the group has been badly confused. This has been due chiefly to two factors, the more important being a remarkable tendency on the part of the German workers to ignore the most basic ideas of type designation and to operate upon a principle of personal convenience rather than abide by the concept of priority. To a lesser extent, confusion has resulted from an inclination to disregard the works of earlier writers (a fault which, however, has by no means been exclusively European), and a great number of synonymic names has been established.

That the systematic study of the Diplopoda is still in its infancy need hardly be emphasized. A legion of genera and even families remain to be set up and integrated, during which process all of the names thus far proposed will, of course, have to be dealt with. Since determination of the type species of all genera is a primary consideration in such work, the following list has been prepared as the first step in the right direction. To the best of my knowledge, it is the only such compilation made for any group since Silvestri's 1896 list of the known genera of the class.

It may be explained by way of introduction that the family Platyrrhacidae is here understood to include only the species in which the edge of the paranota is not thickened or provided with a distinct marginal swelling, and in which the repugnatorial pore is usually removed some distance from the margin of the paranotum and set on its upper surface, usually in a flat, polished peritreme. In occasional species the pore may be set close to the edge, but in such cases the habitus of the animal is such to render it unmistakably related to typical members of the family. The preanal scale is subtrapezoidal in shape (distally truncate or concave), a feature which occurs in but one genus of the closely related family Euryuridae.

The only workers who have dealt extensively with the family are Cook (1896a, 1896b) and Attems (1914, 1938). Cook recognized a great number of genera on the basis of body form; Attems but a few, founded upon the male genitalia. However, Attems' treatment is over conservative and his artificial grouping of great numbers of

species is more unsatisfactory than Cook's equally overzealous analysis. I believe that the male genitalia do afford the only workable basis for generic divisions, but the limits of such genera will have to be drawn with more care and inclusive discrimination than Attems practiced. I have previously remarked the artificiality of his arrangement (1953, Jour., Wash. Acad. Sci., 43: 301, footnote 2).

Perhaps the most misused generic names in this group are *Stenonia* Gray, *Acanthodesmus* Peters, *Platyrhacus* Koch, and *Odontodesmus* Saussure. I have devoted particular attention to resolving the status of each, and believe that the results will be satisfactory to most of my co-workers.

A word of caution is addressed to those who, like myself in the recent past, rely upon the authority of Carl Attems' encyclopaedic volumes on various milliped groups. Although Attems' work is unexcelled in its general usefulness, it is infested with minor inaccuracies, particularly of a bibliographic and nomenclatorial nature. It may be stated that all of his type designations in the three volume "Polydesmoidea" are subject to suspicion and none should be accepted without the verification of an examination of the literature involved. Attems' tendency to designate a species not originally included in a genus as its type was noteworthy. His concept of *anomen nudum* was also faulty, and he thus proposed many redundant new names to replace older ones which were, under the provisions of the International Rules of Zoological Nomenclature, validly proposed and occupied.

It is hoped that this account will prove to be of value and that it may serve to impress upon others the immediate necessity for meticulous bibliographic work before additional taxonomic studies are made. Because of its specific purpose, this paper does not endeavor to indicate generic synonymy, nor to set up new names. Such activity should properly be reserved for a general zoological treatment of the entire family.

I would particularly like to express my appreciation to Dr. J. G. Franclemont, whose knowledge of the principles of nomenclature and willingness to assist in their application to the present instances has greatly facilitated completion of the following account.

Family PLATYRHACIDAE Pocock

The spelling of both the family and its typical genus has been subject to considerable variation. Aside from obvious errors and misprints, the following four renditions have been observed:

Platyrhachidae Pocock, 1895, Ann. Mus. Genova, 34: 788.

Platyrhacidae Cook, 1896, Brandtia, no. 1, p. 1.

Platyrachidae Pocock, 1909, Biol. Centr.-Amer., Diplop., p. 137.

Platyrhachidae Attems, 1938, Das Tierreich, 69: 202.

It is interesting to note that in 1938 Attems used the correct form *Platyrhacus* but continued to spell the family name with an extra "h", *Platyrhachidae*. The generic name has been observed to vary as follows: *Platyrhacus* Koch, 1847, Syst. Myriap., p. 58.

Platyrhachus Pocock, 1894, Weber's Reise Niederl.-Ost. Ind., 3: 343.

Platyrhachus Pocock, 1895, Ann. Mus. Genova, 34: 788.

Platyrhachis Silvestri, 1897, Abh. Mus. Dresden, 6 (9): 19.

Platyrhacus Attems, 1897, Abh. Senckenb. Ges., 23: 490.

Platyrrachus Pocock, 1909, Biol. Centr.-Amer., Diplop., p. 137.

ACANTHODESMUS Peters, 1864, Monats. Preuss. Akad. Berlin, p. 547.

Proposed with five species.

Type: *Polydesmus (Acanthodesmus) pilipes* Peters, 1864, by subsequent designation of Silvestri, 1896.

Peters treated 79 species in his paper under the name *Polydesmus* Latreille, disposing of them among 12 subgenera. The platyrrhacid forms were grouped under *Odontodesmus* Saussure and *Stenonia* Gray (of which *Platyrrachus* Koch was given as a synonym). Fourteen species were thus listed in the subgenus *Stenonia* until, after the description of *P. scutatus* Peters, the following paragraph was inserted:

“Wenn man die Polydesmi, die bisher sehr vernachlässigt sind, erst genauer kennen wird, müssen diese durch die Dornen der Basalglieder der Beine ausgezeichneten Arten generisch von den anderen *Stenonia* geschieden werden und schlage ich für dieselben den Namen *Acanthodesmus* vor.”

Peters obviously mistook the sterna spines to be projections of the coxae. The name *Acanthodesmus* thus originally included all of the species of the subgenus *Stenonia* in Peter's list which have sternal spines, and not just *P. pictus*, which was the species immediately following the diagnosis.

ACISTERNUM Silvestri, 1896, Ann. Mus. Genova, 36: 190.

Monobasic.

Type: *Platyrrhacus monticola* Pocock, 1894, by original designation.

ARCYDESMUS Cook, 1896, Brandtia, no. 12, p. 54.

Monobasic with a new species.

Type: *Arcydesmus comptus* Cook, 1896, by original designation.

AYMARESMUS Chamberlin, 1941, Bull. Amer. Mus. Nat. Hist., 78:

Proposed with seven new species.

Type: *Aymaresmus tapichus* Chamberlin, 1941, by original designation.

BARYDESMUS Cook, 1896, Brandtia, no. 12, p. 53.

Monobasic with a new species.

Type: *Barydesmus kerri* Cook, 1896, by original designation.

CRADOESMUS Cook, 1896, Brandtia, no. 1, p. 3.

Monobasic.

Type: *Platyrrhacus subspinosus* Pocock, 1894, by original designation.

CYRTORHACHIS Silvestri, 1896, Ann. Mus. Genova, 36: 190.

Monobasic.

Type: *Platyrrhacus subalbus* Pocock, 1894, by original designation.

CYPHORRHACUS Cook, 1896, Brandtia, no. 12, p. 52.

Monobasic with a new species.

Type: *Cyphorrhacus andinus* Cook, 1896, by original designation.

DERODESMUS Cook, 1896, Brandtia, no. 1, p. 1.

Monobasic with a new species.

Type: *Derodesmus flagellifer* Cook, 1896, by original designation.

DICRODESMUS Silvestri, 1896, Ann. Mus. Genova, 36: 190.

Monobasic.

Type: *Platyrrhacus bidens* Pocock, 1894, by original designation.

DIONTODESMUS Pocock, 1897, Ann. & Mag. Nat. Hist., (6) 20: 443.

Proposed with two new species.

Type: *Diontodesmus woodfordi* Pocock, 1897, by original designation.

- DYNESMUS Chamberlin, 1941, Bull. Amer. Mus. Nat. Hist., 78:
 Monobasic with a new species.
 Type: *Dynesmus iquitus* Chamberlin, 1941, by original designation.
- ERNOSTYX Chamberlin, 1941, Bull. Amer. Mus. Nat. Hist., 78: 497.
 Proposed with three new species.
 Type: *Ernostyx moyobombus* Chamberlin, 1941, by original designation.
- EURYDIRORHACHIS Pocock, 1897, Ann. & Mag. Nat. Hist. (6) 20:
 435.
 Proposed with two new species.
 Type: *Eurydirorhachis dulitensis* Pocock, 1897, by present designation.
- EUTRACHYRHACHIS Pocock, 1897, Ann. & Mag. Nat. Hist. (6)
 20: 441.
 Proposed with two species.
 Type: *Eutrachyrhachis victoriae* Pocock, 1897, by original designation.
- HAPLORHACUS Attems, 1914, Arch. Naturg., 80 A (4): 273.
 Proposed with seven species.
 Type: *Platyrrhacus doryphorus* Attems, 1899, by subsequent designation of Attems, 1932.
 In 1938 (Das Tierreich 69: 281) Attems overlooked his own earlier selection and stated that *Platyrrhacus haplopus* Attems, 1897, is the type species of this genus.
- HARPODESMUS Cook, 1896, Brandtia, no. 1, p. 3.
 Monobasic.
 Type: *Platyrrhacus laticollis* Pocock, 1894, by original designation.
- HOPLURORHACHIS Pocock, 1897, Ann. & Mag. Nat. Hist. (6) 20:
 437.
 Proposed with two new species.
 Type: *Hoplurorhachis Everetti* Pocock, 1897, by original designation.
- ILODESMUS Cook, 1896, Brandtia, no. 1, p. 1.
 Monobasic.
 Type: *Polydesmus Meyenii* Brandt, 1841, by original designation.
- LEUCODESMUS Cook, 1896, Brandtia, no. 1, p. 3.
 Monobasic.
 Type: *Platyrrhacus Weberi* Pocock, 1894, by original designation.
- LEURODESMUS Cook, 1896, Brandtia, no. 1, p. 2.
 Monobasic.
 Type: *Polydesmus sumatranus* Peters, 1864, by original designation.
- MNIODESMUS Cook, 1896, Brandtia, no. 1, p. 2.
 Monobasic with a new species.
 Type: *Mniodesmus crossotus* Cook, 1896, by original designation.
- NANORHACUS Cook, 1896, Brandtia, no. 12, p. 54.
 Monobasic.
 Type: *Platyrrhacus luciae* Pocock, 1894, by original designation.
- NYSSODESMUS Cook, 1896, Brandtia, no. 12, p. 53.
 Monobasic with a new species.
 Type: *Nyssodesmus alboalatus* Cook, 1896, by original designation.
- ODONTODESMUS Saussure, 1860, Mem. Soc. Geneve, 15 (2): 328.
 Proposed with two species.
 Type: *Polydesmus javanus* Saussure 1859, by subsequent designation of Silvestri, 1896.

OZORHACUS Attems, 1932, Res. Sci. Voy. Ind. Or. Neerl., 3 (12):14.
Proposed with eight species.

Type: *Platyrrhacus katantes* Attems, 1899, by original designation.

Overlooking his original proposal of this name in 1932, Attems later (1938, Das Tierreich, 69: 253) proposed it again as a new subgenus, citing the same type and including the same species.

PARAZODESMUS Pocock, 1898, in: Willey, Zool. Results, 1: 68.

Monobasic with a new species.

Type: *Parazodesmus verrucosus* Pocock, 1898, by original designation.

PHRACTODESMUS Cook, 1896, Brandtia, no. 1, p. 1.

Monobasic.

Type: *Polydesmus subvittatus* Peters, 1864, by original designation.

PHYODESMUS Cook, 1896, Brandtia, no. 1, p. 1.

Proposed with seven species.

Type: *Polydesmus pictus* Peters, 1864, by original designation.

PLATYRHACUS Koch, 1847, Syst. der Myriap., p. 131.

Proposed with three species.

Type: *Platyrrhacus scaber* Koch, 1847, by subsequent designation of Silvestri, 1896 (*See below.*)

PLEORHACUS Attems, 1914, Arch. Naturg., 80 A (4): 263.

Proposed with 32 species.

Type: *Platyrrhacus medioteniatus* Attems, 1914, by subsequent designation of Attems, 1932.

Although *medioteniatus* was not formally published as a new species until 1915, the name first appeared in a key to the forms of *Pleorhacus* in Attems' 1914 paper on Indo-australian myriapods. It was there well differentiated from its congeners and a type locality was cited, so that the species can be considered as dating from 1914.

PLUSIOPORODESMUS Silvestri, 1898, An. Mus. Buenos Aires, 6: 64.

Monobasic with a new species.

Type: *Plusioporodesmus bellicosus* Silvestri, 1898, by original designation.

POLYDESMORHACHIS Pocock, 1897, Ann. & Mag. Nat. Hist. (6) 20: 445.

Monobasic with a new species.

Type: *Polydesmorhachis atratus* Pocock, 1897, by monotypy.

PROASPIS Loomis, 1941, Journ. Washington Acad. Sci., 31: 193.

Monobasic with a new species.

Type: *Proaspis aita* Loomis, 1941, by original designation.

PRODESMUS Cook, 1896, Brandtia, no. 1, p. 3.

Monobasic.

Type: *Platyrrhacus submissus* Pocock, 1894, by original designation.

PSAMMODESMUS Cook, 1896, Brandtia, no. 12, p. 52.

Monobasic with a new species.

Type: *Psammodesmus cos* Cook, 1896, by original designation.

PSAPHODESMUS Cook, 1896, Brandtia, no. 1, p. 2.

Proposed with two species.

Type: *Polydesmus concolor* Peters, 1864, by original designation.

RHYPHODESMUS Cook, 1896, Brandtia, no. 12, p. 54.

Monobasic with a new species.

Type: *Rhyphodesmus terminalis* Cook, 1896, by original designation.

SPILODESMUS Cook, 1896, Brandtia, no. 12, p. 54.

Monobasic with a new species.

Type: *Spilodesmus exsul* Cook, by original designation.

STENONOIDES Pocock, 1897, Ann. & Mag. Nat. Hist. (6) 20: 430.

Proposed with four new species.

Type: *Stenonoides Catorii* Pocock, 1897, by original designation.

TIRODESMUS Cook, 1896, Brandtia, no. 12, p. 53.

Monobasic.

Type: *Polydesmus fimbriatus* Peters, 1864, by original designation.

XERODESMUS Cook, 1896, Brandtia, no. 1, p. 2.

Monobasic with a new species.

Type: *Xerodesmus dratus* Cook, 1896, by original designation.

ZODESMUS Cook, 1896, Brandtia, no. 1, p. 3.

Monobasic.

Type: *Stenonia tuberosa* Pocock, 1894, by original designation.

Further Notes on *Platyrrhynchus scaber* Koch

It has long been considered that this name dated from the description of *Polydesmus scaber* by Perty in 1823, although in 1896 its author was stated by Silvestri to be C. L. Koch. Although I have not been able to find a copy of Perty's original description, the brief description given in 1847 by Gervais and the locality cited (the mountains of Minas Gerais, Brazil) both indicate that Perty's species is a chelodesmoid (leptodesmoid) rather than platyrrhynchid form. Koch's name, therefore, is not a junior synonym of Perty's, and dates from 1847.

In my 1953 paper on *Psammodesmus* (Jour. Wash. Acad. Sci. 43: 300), I discussed the application of *Platyrrhynchus* to a South American Genus, suggesting the restriction of the name to "... that genus which is most numerous in species and has the widest range. . . . The group which most readily qualifies is that including *clathratus*, *bilineatus*, *propinquus*, *tenebrosus*, and their close relatives."

This somewhat empirical resolution of the matter has turned out to be more satisfactory than I could have anticipated two years ago. Since then, I have had access to a copy of Koch's "Die Myriapoden" in which the type of *scaber* is illustrated and fully described. And, since this species, upon which the genus rests, is not the same as Perty's earlier one, the matter of its identity becomes much easier of determination. Koch figures and describes an animal which is brownish-gray with two paramedian yellowish dorsal stripes. A survey of the world literature reveals that less than 15 species with this type of coloration have been described. All are from the upper drainage basin of the Amazon River, in Peru, Ecuador, and Colombia, and with two exceptions, all belong to the group of which I cited examples above! I am now inclined to believe that when the diplopod fauna of this region has been thoroughly worked out, it will become possible to allocate the name *scaber* to a species with considerable confidence of accuracy.

THE STATUS OF STENONIA GRAY, 1842, AND A SUGGESTION OF ITS POSSIBLE IDENTITY

Since the time of Gervais' treatment of the myriapod groups in Walckenaer's *Historie Naturelle des Insectes* (1847), the generic name *Stenonia* of Gray has been regarded as applicable to one of the platy-

rhacid groups, and was subsequently used in that sense by Saussure (1859) and Peters (1864) as well as others. I believe, however, after considerable deliberation, that the name as defined by its subsequently designated type species, is not to be included in the Platyrrhacidae.

Stenonia was proposed in R. B. Todd's *Cyclopedia of Anatomy and Physiology* (1842), in a classification of the diplopods clearly stated to be written by J. E. Gray. The name was very briefly diagnosed² and proposed without any included species. We can infer only that the name was based on one or more polydesmoid species in which the lateral edges of the paranota are incised or dentate. Gray himself disregarded the name in subsequent work, such as his catalog of the myriapods in the British Museum, published in 1844. Various other workers have accepted or rejected the name, and a considerable amount of confusion has arisen concerning its application. At the present, it appears to be disregarded or forgotten. In 1896 (Brandtia, 12: 51) Cook set a precedent in stating that *Stenonia*, having had no type species assigned by its author, is a *nomen nudum* and can be neglected.

Stenonia, however, is not a *nomen nudum*, since the name was accompanied by a brief description. The first species associated with the generic name were *Iulus dentatus* Olivier 1792, *Polydesmus Mexicanus* Lucas 1840, *Polydesmus bilineatus* Lucas 1840, and *Polydesmus Dunalii* Gervais 1844. These were all regarded as forms of *Stenonia* by Gervais in 1847, when he wrote (*op. cit.*, p. 95):

"4. Certaines espèces ont les caractères des précédentes, mais les carènes de leurs segments, au lieu d'être plus ou moins épaissies, sont au contraire minces et denticulées, et elles ont leurs pores répugnatoires à la face supérieure. Ce sont les *Stenonia* de M. Gray.

"*Polydesmus dentatus*, *Mexicanus*, *bilineatus*, *clathratus*, *Dunalii*, etc."

In the text of his paper, however, Gervais continued to refer to the five species cited as members of the genus *Polydesmus*. From his usage it is clear that he considered such Gray names as *Fontaria* and *Stenonia* as synonyms (rather than subgenera) of his *Polydesmus*, a fact which does not militate against his reference of species to a synonymized name as an accountable nomenclatorial action.

Of these five originally included species, no selection of a type was made until 1896, when Cook wrote (*op. cit.*, p. 51):

"If we accept for *Stenonia* a type species proposed by a later writer, it must be *Polydesmus dentatus* (Olivier), a species not known to Gray, a result certainly not in the interest of either justice or clearness."

While there is much to be said for Cook's sentiment in this instance, there is no doubt from his wording that his comment constitutes definite selection of a type species from the first species to be referred to the genus following its original description.

This nomenclatorial consideration appears to be well-founded. But a great deal of mystery still surrounds the identity of *dentatus* itself (apparently not seen since its first collection), and cannot at the present be resolved entirely. The following inferences from published information, however, may be of interest to other workers.

The original description of *Iulus dentatus* Olivier (1792, *Encyclop. method. insect.*, vol. 7, p. 417) is very brief, and gives little of systematic value. It states that the species is about twice the size of *Poly-*

desmus complanatus (ergo, about 50-60 mm. long), that the paranota are unequally dentate (that is, armed with several acute tubercles of variable size), and that each metatergite bears a transverse depression behind which are one or two rows of tubercles. The color is said to be reddish-brown, and the provenance of the type specimen stated to be Cayenne, French Guiana.

Nothing further is given, and it seems that later descriptions are but repetitions of Olivier's. Therefore, it appears likely that Gervais' association of the species with four genuine species of Platyrhacidae was based upon an assumption of relationship rather than on personal knowledge that the pores in *dentatus* are on the upper side of the paranotum.

So far, only a single species of Platyrhacidae [*Rhyphodesmus druii* (Gray)] has been obtained in the Guianas, or, for that matter, in all of northeastern South America. A specimen of this species at hand does not match Olivier's description in any respect except size. But a rather close concordance is to be found in the description of *Leptherpum zerneyi* (Attems, 1931, Zoologica, 30 (79): 48), a leptodesmoid species from northeastern Brasil. I do not suggest conspecificity of the two, but strongly suspect that both may belong to the same genus. Since *zerneyi* is clearly not congeneric with the type of *Leptherpum* (*carinovatum* Attems 1899), the status of that genus would not be affected by the possible location of *zerneyi* in *Stenonia*.

This supposition, of course, is one which can be settled only by extensive field work in the vicinity of Cayenne, to determine the extent of the diplopod fauna of that region and how many forms meet the few stipulations of the descriptions of *dentatus*.

LITERATURE CITED

- Attems, Carl Graf. *Myriapoden*. Abhandl. Senckenb. naturforsch. Gesellschaft, vol. 23, pp. 473-536, pl. 21-25. 1897.
- . *System der Polydesmen*. II Theil. Denkschr. Kaiserl. Akad. Wissensch. Wien, Math.-Naturwiss. Classe, vol. 68, pp. 251-435, pls. 12-17. 1900.
- . *Die Indoaustralischen myriapoden*. Archiv für Naturgesch., vol. 80, sec. A, no. 4, pp. 1-298, 1914.
- . *Resultats Scientifiques du Voyage aux Indes Orientales Néerlandaises de LL. AA. RR. le Prince et la Princesse Leopold de Belgique*, vol. 3, fasc. 12, pp. 3-34. (Memoires du Musée Royal d'histoire Naturelle de Belgique). Bruxelles. 1932.
- . *Polydesmoidea II. Fam. Leptodesmidae, Platyrhachidae, Orydesmidae, Gomphodesmidae*. Das Tierreich, lief. 69, pp. i-xxvi, 1-487. Walter de Gruyter & Co., Berlin und Leipzig, 1938.
- Chamberlin, Ralph V. *On a collection of millipedes and centipedes from northeastern Peru*. Bull. Amer. Mus. Nat. Hist., vol. 78, pp. 473-535, figs. 1-230. 1941.
- Cook, O. F. *A synopsis of Malayan Platyrhachidae*. Brandtia, no. 1, pp. 1-4. Huntington, New York, 1896.
- . *New American Platyrhachidae*. Brandtia, no. 10, pp. 51-54. Huntington, New York, 1896.
- Gervais, Paul. *Myriapodes*, in: Walckenaer et Gervais, *Histoire naturelle des insectes*, vol. 4, pp. 1-333. 1846.

- Gray, John Edward. *Myriapoda*, in: Edward Griffith, *The Animal Kingdom arranged in Conformity with its Organization, by the Baron Cuvier*, vol. 15, p. 787, pl. 135. London, 1832.
- . *Myriapoda* (with T. Rymer Jones), in: Robert B. Todd, *The Cyclopaedia of Anatomy and Physiology*, vol. 3, pp. 545-547. London, 1842.
- Hoffman, Richard L. *Psammodesmus*, a neglected milliped genus (*Polydesmida: Platyrrhacidae*). Journ. Washington Acad. Sci., vol. 43, no. 9, pp. 299-304. 1953.
- Koch, Carl L. *System der Myriapoden*. Regensburg, 1847.
- Loomis, H. F. *New genera and species of millipeds from the southern peninsula of Haiti*. Journ. Washington Acad. Sci., vol. 31, pp. 188-195, 17 figs. 1941.
- Peters, W. C. H. *Übersicht der im Königl. zoologischen Museum befindlichen Myriapoden aus der Families der Polydesmi, so wie Beschreibungen einer neuen Gattung, Trachyjulus, der Juli, und neuer Arten der Gattung Siphonophora*. Monatsb. Preuss. Akad. Wissensch. Berlin, pp. 529-551. 1864.
- Pocock, R. I. *Chilopoda, Symphyla, and Diplopoda of the Malay Archipelago*, in: Max Weber, *Zoologische Ergeb. Reise Niederland. Ost-Ind.*, vol. 4, pp. 307-404, 4 pls. 1894.
- . *Report upon the Polydesmoidea collected by Sign. L. Fea, M. E. Oates and others*. Ann. Mus. Civ. Stor. Nat. Genova, ser. 2, vol. 14, pp. 788-834. 1895.
- . *New genera and species of millipedes of the family Platyrrhacidae from the Indo- and Austro-Malayan subregion contained in the collection of the British Museum*. Ann. and Mag. Nat. Hist., ser. 6, vol. 20, pp. 427-446. 1897.
- . *Report on the centipedes and millipedes obtained by Dr. A. Willey in the Loyalty Islands, New Britain, and elsewhere*, in: Willey, "Zoological Results based on material from New Britain, Loyalty Islands, and elsewhere," pt. 1, pp. 59-74, pl. 6. 1898.
- . *Diplopoda*, in: *Biologia Centralia-Americana*, pp. 41-217, pls. 4-15. 1903-1910 (fascicle dealing with Platyrrhacidae dated October 1909).
- Saussure, Henri de. *Note sur la familie des Polydesmides, principalement au point de vue des especes Americaines*. Linnaea entomologica, vol. 13, pp. 318-327.
- Silvestri, Filippo. *I Diplopoda, Parte 1. Sistematica*. Ann. Mus. Civ. Stor. Nat. Genova, ser. 2, vol. 16, pp. 122-254. 1896.
- . *Neue Diplopoden*. Abhandl. Mus. Dresden, vol. 6, no. 9, pp. 1-23, 3 pls., 19 text figs. 1897.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE TAXONOMIC STATUS OF THE BATS *CORYNORHINUS PHYLLOTIS* G. M. ALLEN AND *IDIONYCTERIS MEXICANUS* ANTHONY

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United States National Museum

Among the least known mammals of North America are the big-eared bats *Corynorhinus phyllotis* G. M. Allen (Bull. Mus. Comp. Zool., 60:352, 1916) and *Idionycteris mexicanus* Anthony (American Mus. Nov., 54:1, 1923), each of which is known only by the type specimen.

The first was secured in San Luis Potosí in 1878. It was stuffed with the ears laid forward over the face and with the skull left in the skin. It bore a superficial resemblance to *Plecotus auritus* and was reported as that species by J. A. Allen (Bull. Mus. Comp. Zool., 8:184, 1881). Later the skull was removed. G. M. Allen (*loc. cit.*) noticed the lappets of the accessory basal lobes of the auricles lying over the rostrum, partly concealed by the overlying ears. He mistook them for enlarged muzzle glands and pronounced the specimen to be a new species of *Corynorhinus*, *C. phyllotis*.

The second, obtained in Tamaulipas in 1922, was stuffed with ears erect and the lappets of the accessory anterior basal lobes of the auricles prominently exposed. It was described by Anthony (*loc. cit.*) as a new genus and new species, *Idionycteris mexicanus*, based mainly on the structure of the auricle and the similarity of the skull to that of the Old World *Plecotus*.

I have examined both specimens and have photographed their skulls. The major difference between the two is that the type of *I. mexicanus* is in more worn pelage, allowing the dark hair bases to show through on the dorsum. There appears to be no basis for regarding these specimens as being even subspecifically distinct. *Idionycteris mexicanus* Anthony is, therefore, a synonym of *Corynorhinus phyllotis* G. M. Allen, and the species should be known as *Idionycteris phyllotis* G. M. Allen.

The genus *Idionycteris* may be distinguished from its allies, *Plecotus* and *Corynorhinus*, by the following characteristics: Nostril unspecialized, accessory basal lobe of auricle developed into projecting lappet, calcar keeled, and brain case broad (53 per cent of greatest length of skull as opposed to 48-50 per cent).

I wish to thank H. E. Anthony and G. G. Goodwin, American Museum of Natural History, and Barbara Lawrence, Museum of Comparative Zoology, Harvard University, for the privilege of examining the type specimens here discussed.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE SILKY POCKET MOUSE, *PEROGNATHUS FLAVUS*, IN ARIZONA, WITH A DESCRIPTION OF A NEW SUBSPECIES

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Specimens recently collected by the Museum of Natural History, University of Illinois, together with specimens in the United States National Museum (including those in the Biological Surveys collection), give us added information on the geographical variation and distribution of the silky pocket mouse, *Perognathus flavus*, in Arizona. According to the present evidence, five subspecies of *Perognathus flavus* occur in Arizona. The ranges of these subspecies are shown in figure 1. One of these subspecies is new and may be characterized as follows:

Perognathus flavus goodpasteri, new subspecies

Type.—Adult male, skin and skull, no. 6312, Univ. Illinois Mus. Nat. Hist., from 2¼ miles northwest of Springerville, Apache County, Arizona; collected August 16, 1953, by Charles A. McLaughlin, original no. 476.

Range.—Known only from immediately north of Springerville, Arizona.

Diagnosis.—A race of *Perognathus flavus* characterized by upperparts especially dark in color; sides of face and body bright buffy and not overlaid with black; size small. Color of dorsum is Light Ochraceous-Buff (all capitalized color terms are taken from Ridgway, Color standards and color nomenclature, 1912), heavily overlaid with black; sides of body and nearly all of cheeks near (e) Light Ochraceous-Buff not overlaid with black; nose only lightly overlaid with black; underparts slightly washed with Pinkish Buff; postauricular patches conspicuous and Light Ochraceous-Buff or Pinkish Buff. Size small in both external and cranial features.

Comparisons.—*Perognathus flavus goodpasteri* is most closely allied with *P. f. fuliginosus*, from which its range is rather widely separated (see figure 1). *P. f. goodpasteri* differs from *P. f. fuliginosus* in having the buffy color more extensive on the cheeks, in the scapular region, and above the lateral line; the underparts are less extensively washed with Pinkish Buff; the overlay of black on the dorsum is slightly greater. In the specimens available, it appears that the skull

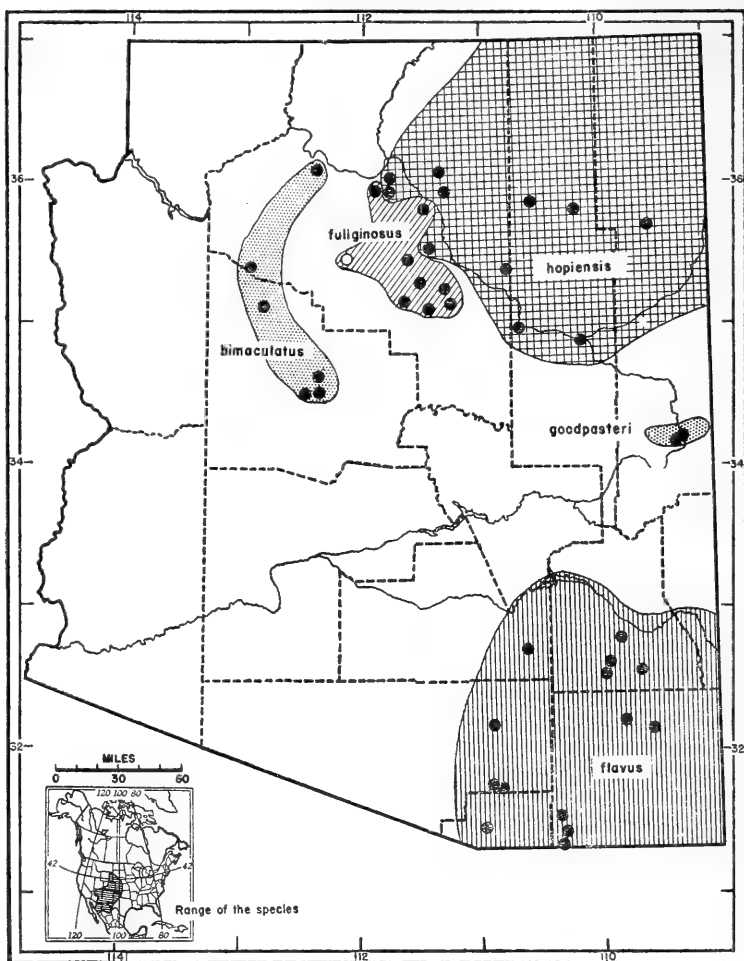


Figure 1. Range of subspecies of *Perognathus flavus* in Arizona.

in *goodpasteri* is shorter (as indicated by basilar and occipitonasal lengths) than in *fuliginosus*.

P. f. goodpasteri differs from *P. f. hopiensis* in having a dorsal coloration much darker, presence of a wash of buff on underparts, conspicuous postauricular patches, ground color of upperparts a deeper, richer buff, and smaller size. *P. f. goodpasteri* differs from *P. f. flavus* in much the same way that it differs from *P. f. hopiensis*. *P. f. goodpasteri* differs from *P. f. bimaculatus* in having a darker coloration, more conspicuous postauricular patches, and smaller size.

Measurements.—The type male, a topotype female, and a female

from 3 miles north of Springerville, all adults, give the following measurements, in millimeters, respectively: total length, 107, 114, 114; tail, 54, 52, 48; hind foot, 17, 16, 17; ear from notch, 7, 6, 6. Cranial measurements of the type and topotype, respectively, are: basilar length, 14.4, 14.3; occipitonasal length, 20.5, 20.5; greatest mastoidal breadth, 12.2, 12.3; least interorbital width, 4.4, 4.6; length of nasals, 7.2, 7.6; width of nasals just in front of incisors, 2.0, 2.2; length of interparietal (along median line), 3.1, 2.8; greatest width of interparietal, 3.1, 3.5; alveolar length of maxillary toothrow, 3.3, 3.2.

Remarks.—*Perognathus flavus goodpasteri* is a dark-colored race found in the plains-like short grassland which is interspersed with volcanic rock just to the north of Springerville, Arizona. This subspecies may occur in some other places along the north rim of the Mogollon Plateau in Navaho and Apache counties, but in our collecting, we found it to be uncommon. *P. f. goodpasteri* differs markedly from the subspecies which are geographically nearest (*hopiensis* and *flavus*) and is most similar to *fuliginosus*. Additional collecting may prove that *goodpasteri* and *fuliginosus* intergrade.

This subspecies is named for Woodrow W. Goodpaster, whose indefatigable and thorough collecting in Arizona has provided us with much valuable information on the mammals of the southwest.

Specimens examined.—Arizona: Apache County: 3 mi. N Springerville, 2 (Univ. Ill., Mus. Nat. Hist.); 2¾ mi. NW Springerville, 2 (Univ. Ill., Mus. Nat. Hist.).

Comments on Other Subspecies of *Perognathus flavus* in Arizona

Five subspecies of *Perognathus flavus* are found in Arizona. Those from along the Mogollon Plateau are dark in coloration, with *goodpasteri* darkest, *bimaculatus* lightest, and *fuliginosus* intermediate. *P. f. bimaculatus* is the largest of the three. Those subspecies from north and south of the Mogollon Plateau, *hopiensis* and *flavus*, respectively, are light colored.

Specimens of *Perognathus flavus* from Arizona in the collections mentioned above indicate that the ranges for those subspecies other than *goodpasteri* may be defined as follows (also see figure 1):

Perognathus flavus bimaculatus Merriam.—Ranges from near Prescott northward around the western side of the Mogollon Plateau through Aubrey Valley to the south rim of Grand Canyon (Pasture Wash Ranger Station, no. 9985, Univ. Ill., Mus. Nat. Hist.).

Perognathus flavus hopiensis Goldman.—In Arizona, occurs in the northeastern corner of the state, mostly north or east of the Little Colorado River and east of the Colorado River. However, known from west of the Little Colorado as follows: southeastern corner of Grand Canyon National Park on the east and west side of Cedar Mountain and the southeast entrance gate to Grand Canyon; along U. S. Highway 89 at entrance to Wupatki National Monument.

Perognathus flavus fuliginosus Merriam.—Ranges along the lower slopes of the San Francisco Mountains and the Mogollon Plateau in the vicinity of Flagstaff, northward nearly to Grand Canyon National Park (Locket Tank in Cedar Ranch Wash). Specimens labelled as Tanner

Tank, near the Little Colorado River, are referable to *fuliginosus*. Reportedly (Jour. Mammalogy, 18:101, 1937) occurs as far west as Bly (indicated on figure 1 by circle).

Perognathus flavus flavus Baird.—In Arizona, occurs in the southeast corner of the state, south of the Gila and east of the Santa Cruz rivers.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF SOME UNDESCRIBED FORMS OF
SCHIZOLACHNUS WITH KEY TO SPECIES FOUND
IN THE UNITED STATES (APHIDAE)

F. C. HOTTES

Three of the forms described here, belong to recently published species, which are treated in a key and figured for the first time.

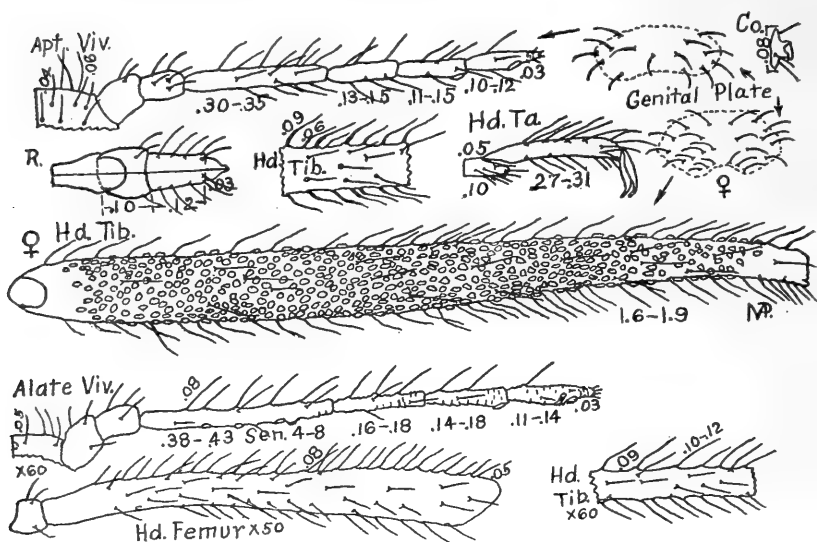
Schizolachnus curvispinosus H.E.K.

Alate viviparous female.

Length varying from 2.40-4.00 mm. Color notes not taken from living specimens. Cleared mounted specimens similar to those of apterous viviparous females. Length of antennal segments as follows: III .375-.45 mm., IV .16-.18 mm., V .14-.195 mm., VI .11-.14 + .03 mm. Sensoria distributed as follows: III 4-9 arranged in an irregular row which in one or two cases is partly double. All sensoria on the third segment small and slightly tuberculate, the primary sensorium on this segment is absent. IV with neither secondary or primary sensoria. V with primary sensorium only. Hair on antennal segments sparse, on third segment almost always absent on posterior margin or nearly so, varying in length from .045-.08 mm. with the longest hairs on the anterior margin roughly equal to width of segment. Antennal hairs almost straight, never strongly bent, at most with a slight curve. Fifth and sixth antennal segments weakly imbricated. Lateral lobes of thorax with few hairs, these confined for the most part to the inner regions along the median margin. Posterior median lobe of thorax with very few hairs. Costal margin of forewing fuscous, radial sector fuscous with border, cubital and anal veins pale fuscous. Media twice branched, very pale. Hind femora varying from 1.125-1.20 mm., provided with numerous coarse slightly curved hairs about .105 mm. in length, these are only slightly curved as a rule and are never strongly bent as in the apterous females. First segment of the hind tarsus varying from .09-.105 mm., second tarsus .33 mm. long.

Dorsum of abdomen with numerous spine-like hairs which are roughly grouped in irregular bands. Hairs on ventral surface of abdomen slightly longer, less spine-like. Cornicles as in apterous females. Cauda with surface slightly setulose, with hairs distributed over entire surface, the shortest and finest being near the middle of the cauda.

Morphotype alate viviparous female, deposited in the United States National Museum. Host *Pinus ponderosa*. Mead Township, Spokane Co. Washington. G. F. Edmunds Jr. & R. K. Allen collectors. June 14, 1955.



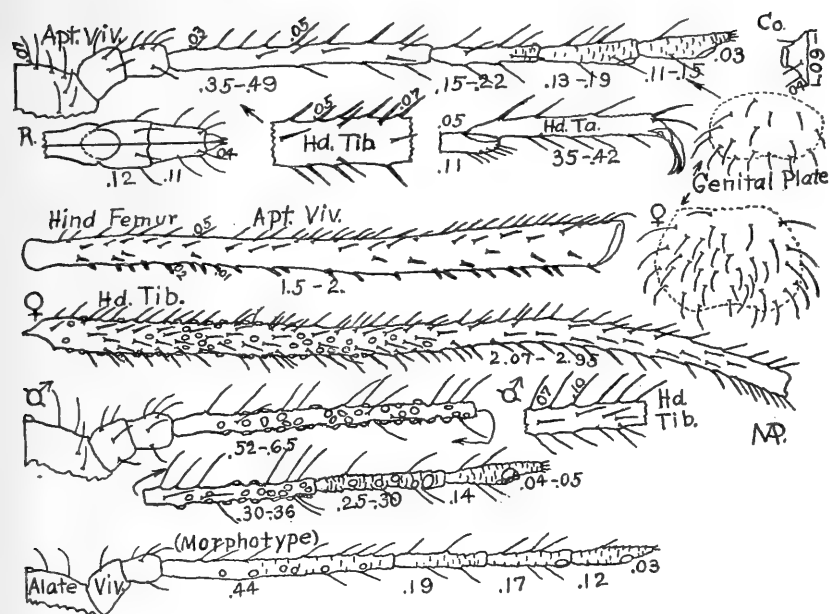
Schizolachnus curvispinosus HEK

Schizolachnus wahlea H.

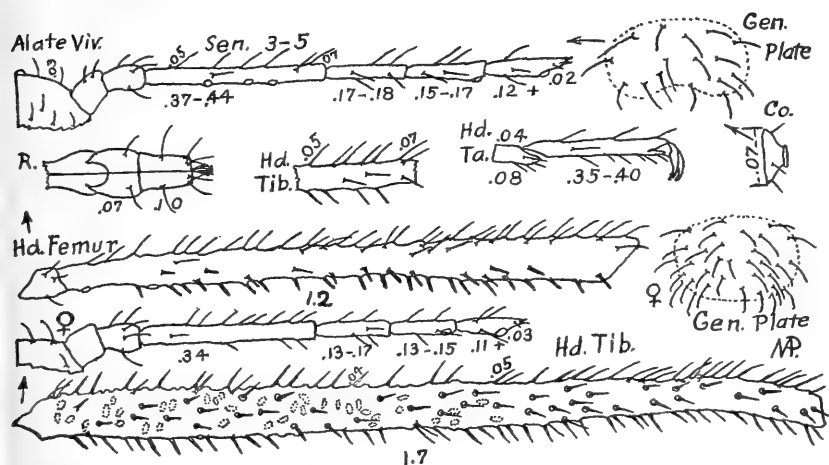
Alate viviparous female.

Length from vertex to end of anal plate varying from 1.65-2.10 mm. Color and distribution of powder similar to that of apterous viviparous female. Length of antennal segments as follows: III .42-.45 mm., IV .18-.19 mm., V .165-.185 mm., VI .105-.12 + .03 mm. Sensoria distributed as follows: III four to six secondary sensoria, these are more or less in a row and are always small, the primary sensorium is present on this segment. The fourth antennal segment is without sensoria. The fifth antennal segment has only the primary sensorium present. Hair on antennal segments sparse inclined at an angle of about forty-five degrees, the ratio of length to width of third segment in mid region 4-3, ratio of length to width of same segment in apical region 5-3, all hair spine-like. Ocular tubercles present but poorly developed. Rostrum reaching to or slightly beyond mesothoracic coxae. Median suture of head narrow and dark brown. Media exceedingly faint, hardly recognizable and has to be looked for, second branch of media either absent or exceedingly faint and shorter than normal, and not united with media. Anal and cubital veins dark, slightly bordered. Metathoracic femora varying from 1.50-1.80 mm. Metathoracic tibiae varying in length from 2.55-2.82 mm. Hairs on tibiae and femora similar to those of apterous viviparous female. First metatarsal segment varying from .36-.405 mm. Cornicles and cauda as in apterous viviparous female.

Morphotype alate viviparous female. Rearend on *Pinus ponderosa*



Schizolachnus wahlea H.



Schizolachnus tusoca H. & W.

Grand Junction, Colorado, from material taken from tree which produced the holotype. This slide has been deposited in the United States National Museum. Only three specimens of this form have been taken.

Schizolachnus tusoca H.&W.

Oviparous female.

Length from vertex to end of anal plate 2.32 mm. Antennal segments with the following lengths: III .33 mm., IV .15 mm., V .135 mm., VI .09 + .03 mm. Hind femora 1.2 mm., hind tibiae 1.7 mm. Sensoria on hind tibiae numerous, confined to basal half of segment more or less. Rostrum just reaching mesothoracic coxae. Other features as in viviparous female.

Morphotype oviparous female, *Pinus ponderosa* Catalina Mts. Tucson, Arizona, Nov. 27, 1954. G. D. Butler Jr. Deposited in the United States National Museum.

When *S. wahlea* was described, it was stated that it was closely allied to *S. tusoca*. Now that I have seen living forms of both species this statement can be emphasized. In life the two species look alike. Mounted specimens differ in size, length of antennal segments, femora, tibiae and tarsi. The media of the fore wings also differ. Studies should be made on these two species to determine the influence of environment on those factors which have been used to separate them.

Key to American Species of *Schizolachnus*.

1. Hairs on ventral surface of hind femora short, coarse, peg-like.....2
 Hairs on ventral surface of hind femora not short, or peg-like.....3
2. Hind femora 1.5-2 mm. in length, first tarsal segment .11 mm. in length, hind tibiae of oviparous female 2.07-2.95 mm. in length.
 *S. wahlea* H.
 Hind femora 1.2 mm. in length, first tarsal segment of hind tarsus .08 mm. long, hind tibiae of oviparous female 1.7 mm. long.*S. tusoca* H&W
3. Hair on hind tibiae long, and fine, longer than .12 mm. in apterous forms not bent.4
 Hair on hind tibiae coarse, less than .11 mm. in length, in apterous forms strongly bent, in alate forms almost straight or weakly bent, dorsum of abdomen with short spine-like hairs.*S. curvispinosus* H.E.K.
4. Hind tibiae slender, long, black, hind tarsal segment II .30-.37 mm. long.*S. pini-radiatae* (D.)
 Hind tibiae thick, short, with some pale yellow, hind tarsal segment II .25-.28 mm. in length.*S. pineti* (F.)

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF *CINARA* FROM CANADA
(APHIDAE)

By F. C. HOTTES

I wish to acknowledge the assistance of Mrs. M. E. MacGillivray of the Field Crop Insect Laboratory, Fredericton, N. B., Canada who collected the material from which this interesting species is described.

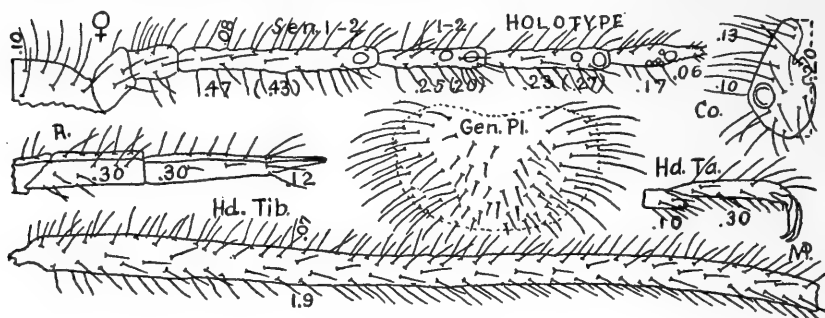
Cinara acadiana n. sp.

Apterous viviparous female.

Size and general color.—Length from vertex to end of anal plate varying from 2.92-3.15 mm. Color notes not made from living specimens. Color of mounted specimens which were cleared, as follows: head dusky brown. First and second antennal segments slightly darker than head, third fourth and fifth antennal segments pale dusky, third segment slightly darker at apex, fourth and fifth segments with apical regions darker than base, sixth antennal segment uniform dusky, much the darkest antennal segment. Femora pale dusky with apical portions much darker. Tibiae dark brown at extreme base, quickly shading to pale dusky to beyond middle, then shading to dark brown which continues to apex. Tarsal segments concolorous with end of tibiae. Cornicles dusky with constricted area darker. Dorsum of abdomen with a few small brownish wax pore plates.

Head and thorax.—Antennal segments with the following lengths: III .435-.51 mm., IV .225-.285 mm. both lengths represented by a single case, most common length .24 mm., V .23-.315 mm. always longer than fourth antennal segment, on a given specimen, VI .15-17 + .06-.075 mm. Sensoria distributed as follows: III as a rule none, never more than one, primary sensorium present. IV one-two, as rule only one, the primary sensorium is present on this segment. V one plus primary. Hair on third segment fairly numerous upstanding, fine, varying in length, with one or two exceptions, less than width of segment, the shortest hairs being about .045 mm. in length, the longest about .08 mm. Second antennal segment with numerous hairs. The sixth antennal segment with very faint imbrications, the unguis nail-like, hair on unguis not confined to end. Extended rostrum reaching beyond cornicles. Last three segments of rostrum with the following lengths .30-.30-.12 or .285-.30-.12 mm. Head with numerous hairs which are slightly longer and coarser than those on antennae.

Width of head across eyes about .69 mm. Eyes small, with ocular tubercles the same. Mesosternal tubercle absent. Femora seemingly short varying from 1.02-1.27 mm. in length. Hind tibiae varying from

*Gnara arcadiana*

1.72-2.02 mm. Hair on hind tibiae fairly numerous, upstanding, fine, varying in length from .045-.075 mm. less than the width of the tibiae, the longest hairs are located near the apex of segment, in this location the hairs are slightly less upstanding. The hairs on the outer margin of the tibiae are longer than the hairs on the inner margin. First tarsal segment with about eight hairs on the ventral surface. First hind tarsal segment varying in length from .10-.12 mm. the second segment varying from .30-.33 mm.

Abdomen.—Dorsal and ventral surfaces of abdomen thickly clothed with long fine sharp pointed hairs, which are similar on both surfaces, these hairs vary from .12-.15 mm. in length. Cornicles extremely variable as to size, and shape of outer margin which is always very irregular. Extent of outer margin of cornicles varying from .12-.36 mm. Base of cornicles much broken, often with clear areas, frequently associated with free pigmented areas. Hairs on cornicles similar to those on abdomen and of one kind, not more numerous on constricted area than elsewhere. Genital plate very large, suggestive of the genital plate of an oviparous form, for which there is no further evidence. Cauda and anal plate with numerous hairs.

I know of no near allies to this species, on its host species *Picea glauca* indicated on slides as *Picea canadensis*. In Palmer's key to the genus *Cinara* in "Aphids of the Rocky Mountain Region" *Cinara acadiana* keys to *Cinara terminalis* G&P., a species with which it has nothing in common except the characters made use of in the key, and from which it may be distinguished at once by the numerous body hairs. From *Cinara piceae* (Panz.) as I think correctly determined by Dr. D. Hille Ris Lambers, this species differs greatly in the character of the hairs found on the tibiae, not being blunt, and in the sixth antennal segment not being strongly imbricated. The two species differ greatly and there is no need to mention other factors in which they differ. Holotype apterous viviparous female, Sept. 22, 1954, taken on *Picea glauca* Acadia Forest Experimental Station, New Brunswick, Canada. Collected by Mrs. M. E. MacGillivray, deposited in the Canadian National Collection, Ottawa, Canada.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF *CINARA* FROM MAINE
(APHIDAE)

By F. C. HOTTES

This new species was among slides of *Cinara* sent me for naming, by Mrs. M. E. MacGillivray of the Field Crop Insect Laboratory, Fredericton, N. B. Canada, and I gladly acknowledge her assistance.

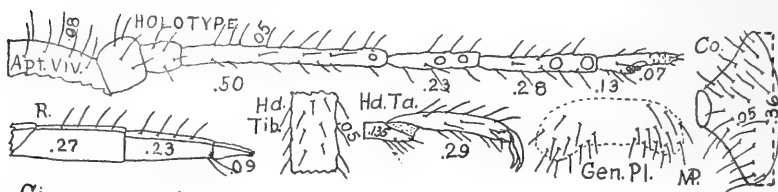
Cinara soplada n. sp.

Apterous viviparous female.

Length from vertex to end of anal plate 3.07mm. Color notes from life not available. The single specimen from which this species is described has been cleared and mounted very flat, it indicates the head and thorax and the first antennal segment as being pale brown, femora yellowish at the extreme base, shading to brown. The metathoracic femora are much darker than the pro and mesothoracic femora, and unlike them much darker towards the apex. Tibiae brown with pale region in basal third of segment. Tarsal segments concolorous with end of tibiae. Cornicles pale brown, with extreme outer margin slightly lighter in color. Dorsum of abdomen with two rows of small wax pore plates at each side. Cauda and anal plate brown.

Head and thorax.—Antennal segments with the following lengths: III .50mm., IV .23mm., V .28mm., VI .13 + .07 mm. Sensoria distributed as follows: III with primary sensorium, no secondary sensoria, IV and V with primary sensoria and one secondary sensorium. Hair on antennae sparse, fine, sharp-pointed, upstanding, some on third segment set at ninety degrees, none less than sixty degrees. Third antennal segment with short region near apex brownish, fourth and fifth segments similar, but with the brown more extensive, sixth segment uniform brown. Apical half of fourth, and all of fifth and sixth antennal segments very weakly imbricated, the imbrications being so poorly developed that they have to be looked for. Median suture of head not much darker than adjacent area. Ocular tubercles small but very distinct. Rostrum retracted, so that its length can only be estimated to reach slightly beyond cornicles, the last three segments measuring as follows: .27, .23 and .09mm. Hind femora 1.44mm. long, provided with rather coarse hairs which are about one fifth as long as the width of the femora. Hind tibiae 2.03mm. in length, with hairs rather coarse, the hairs on the outer margin being rather dull at the end, the hairs on the inner margin being sharp-pointed. The hairs on the outer margin are about .05mm. long, and are spaced farther apart than their length, which is slightly less than one half the width of the tibiae. Hairs near apex of tibiae not more numerous than elsewhere, with those on the ventral apex very short.

First tarsal segment of hind tarsus .135mm. in length, provided with

*Cinara soplada*

about eleven hairs of the ventral surface, second tarsal segment .29mm. long, hairs on the dorsal and ventral surfaces of this segment similar, but less numerous on the dorsal surface. Abdomen.—Cornicles .36mm. across, with outer margin quite regular, hairs on cornicles uniformly distributed over the surface, and not more numerous on the constricted area. Dorsum of abdomen almost free from hairs, this fact is very difficult to determine because the specimen is very compressed, the few hairs present are extremely short. Hairs on the ventral surface of the abdomen fine, sharp-pointed, not numerous, for the most part farther apart than their length. Genital plate broadly excavated along the posterior margin, the hairs on this structure are confined to the ends. Pigmented spots anterior to the cauda divided with a single row of about five hairs along the posterior margin. Cauda and anal plate provided with well developed setulose surfaces. Hairs on cauda confined largely to the posterior margin. Long hairs on cauda and anal plate arising from extremely well developed wart-like tubercles.

Because of the short blunt tipped hairs on the outer margin of the hind tibiae, I suspect that most Aphid workers would take one look at this species and determine it as *Cinara coloradensis* (G) which also has *Picea* for a host. Actually *C. soplada* differs greatly from *C. coloradensis* and may be differentiated from it at once by the fact that the hairs on the cornicles are uniformly distributed over the surface and not confined to the constricted area as they are in *C. coloradensis*, cleared specimens of which also show the cornicles to be two toned. *C. coloradensis* also has the last segments of the antennae strongly imbricated, and the second segment of the hind tarsus is longer. *C. coloradensis* also has the tip of the unguis different, there being two wart-like structures, one at the tip and other slightly back, in *C. soplada* there is only one, situated at the tip.

In Palmer's key to the genus *Cinara* in "Aphids of the Rocky Mountain Region" *C. soplada* keys to couplet eight, and comes most nearly agreeing with requirements for *C. flexilis* (G&P) from which it can be differentiated at once by the fact that the hairs on the first tarsal segment of the hind tarsus are confined to the ventral surface. It should be noted *C. coloradensis* has few and extremely short hairs on the dorsum of the abdomen, and to be keyed to *coloradensis* in Palmer's key, the hair on the ventral surface must be taken to fulfill requirements of couplet six. When *C. soplada* is thus keyed it will not key to *C. coloradensis* because the fourth antennal segment is shorter than one and one half times the total length of the sixth antennal segment. It may be distinguished from *C. piceae* (Panzer) by the distribution of hair on the

cornicles, by the poorly developed imbrications on the antennae and by the short hairs on the dorsum of the abdomen.

Holotype apterous viviparous female, deposited in the National Museum of Canada. Host on slide indicated only as Scrub Spruce, this could be red, black, or white spruce, the name scrub spruce being often given for poorly growing trees. The specimen was taken August 20, 1944, by Procter during his Mt. Desert Survey. The locality is given as a hill back of Shea's Corner, Mt. Desert, Maine.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW HERMIT THRUSH FROM CANADA

BY HARRY C. OBERHOLSER

In revising the forms of *Hylocichla guttata* (Pallas) several years ago, the writer discovered an undescribed race. This it seems desirable to publish at the present time. It may be known as

***Hylocichla guttata euboria*, new subspecies**
Yukon Hermit Thrush

Subspecific Characters.—Similar in color to *Hylocichla guttata guttata*, in both gray and brown phases, but larger excepting its relatively smaller bill.

Measurements.—*Adult male*. Wing, 89.9-96.0 (average, 92.7) mm.; tail, 67.6-76.0 (72.1); exposed culmen, 10.9-13.5 (13.2); tarsus, 26.4-30.0 (29.0); middle toe without claw, 15.0-17.3 (15.8). *Adult female*. Wing, 89.9-93.5 (92.0); tail, 67.8-71.9 (69.3); exposed culmen, 11.4-12.7 (12.2); tarsus, 27.9-30.5 (29.2); middle toe without claw, 15.4-16.0 (15.2).

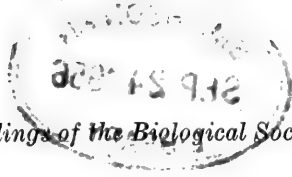
Type.—Adult male, No. 165716, United States National Museum, Fish and Wildlife Service collection; Lewes River, Yukon River, Yukon, Canada; July 21, 1899; W. H. Osgood, original number 156.

Geographic Distribution.—Breeds north to southern Yukon; west to west central British Columbia; south to central British Columbia; and east to central British Columbia and central southern Yukon. In migration ranges casually east to central northern Ohio and central western Indiana. Winters north to northern Oklahoma, south central Texas, and north central California; and south to central western California and central western Nuevo Leon.

Remarks.—This Hermit Thrush seems to be somewhat closer in characters to *Hylocichla guttata sequoiensis* and *Hylocichla guttata guttata* than to any of the other races of the species, but still different enough by reason of its combination of characters to be recognized as a geographical entity. It may be distinguished from *Hylocichla guttata sequoiensis* by its somewhat darker coloration, somewhat shorter wing, and decidedly smaller bill.

Birds of this species obtained during the breeding season in Yukon have been by Robert Ridgway and other authors referred to *Hylocichla guttata sequoiensis*, but they of course belong to the subspecies here first described.

Examples from central British Columbia, although not typical of *Hylocichla guttata euboria*, are apparently nearer this race than to *Hylocichla guttata oromela*.





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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A STATISTICAL STUDY OF *THAMNOPHIS*
BRACHYSTOMA (COPE) WITH COMMENTS ON THE
KINSHIP OF *T. BUTLERI* (COPE).

BY A. J. BARTON

The Stony Brook School, Stony Brook, L. I., N. Y.

The short-headed gartersnake has had a stormy taxonomic history. Originally described by Cope in 1892 from Franklin, Venango County, Pennsylvania, the name *brachystoma* was suppressed by Ruthven (1908), who, while noting that he lacked sufficient specimens to reach any position of certainty, considered it to be a synonym for *Thamnophis butleri* (Cope) 1889. Albert G. Smith reviewed the *butleri* complex in 1945 and decided that two distinct species were recognizable. For the more eastern of these he resurrected Cope's name *brachystoma*.

The Carnegie Museum took immediate steps to secure an adequate representation of this revived species, and at the invitation of Dr. M. Graham Netting, I began a statistical analysis of these specimens in 1947. Other duties forced me to lay aside this project, unfortunately, before its completion.

In 1949, Smith again considered the group, and this time reversed himself by deciding that *butleri* and *brachystoma* were subspecifically related, and that both were races of the plains gartersnake *T. radix*. Conant (1950) conclusively demonstrated that *radix* is specifically distinct from *butleri*. Conant (1950, 1951) further held that *brachystoma* shows no signs of intergrading with *butleri*, and that "in view of the marked difference between them," they must be retained as discrete species. Conant premised his views on Smith's data, a key phrase to Conant's comments reading, "—if Smith's data are accurate—."

A number of unfortunate errors had crept into Smith's work, especially the 1949 contribution, which sharply limit its usefulness by leaving the reader uncertain as to what is valid and what is erroneous. In his first paper, for example, Smith reported (1945, 149) that in *Thamnophis brachystoma* the scales "are almost always arranged in 17-17-17 rows," but in the second contribution (1949, 288, table 1) he omits the formula 17-17-17 entirely from his summary for *brachystoma* and instead states that 99.75% of his sample exhibit the formula 17-17-15. Changing his figures again, he reports on page 295 that 216 of his 221 specimens showed the formula 17-17-15 ($216/221 = 97.7\%$, not 99.75%). But on

page 297, he offers his reader a third choice by stating for *T. radix brachystoma*, under the heading *Diagnosis*, "A gartersnake in which the dorsal scales are reduced to 17 rows *throughout*" (italics mine)! Similarly, for *brachystoma*, he equates 4/221 on page 295 with 0.21% on page 288 (it should read 1.81%), 1/221 with 0.04%; for *butleri* 228/237 with 99.68% (instead of 96.2%), 7/237 with 0.29%, etc. In the consideration of *brachystoma's* supralabials (1945, 150) he refers to six individuals as constituting 0.04% of his sample, yet his sample numbers not 15,000 (as this value would require), but 221.

It is in the hope of clearing a path through this confusion that I have returned my attention to my old notes, and offer the following data.

Material and Methods

The sample reported upon herein is composed of 154 specimens, of which 110 are males, 34 are females, and ten are of undetermined sex. All are in the collection of the Carnegie Museum (C.M.), and were taken from the following Pennsylvania localities, which were among those previously mapped by Richmond (1952):

SPECIMENS EXAMINED:

CLARION: Strattonville C.M. 28156-66, 28169, 28171, 28233-37.

ELK: Portland Mills C.M. 28393-95; Pa. route 949, $\frac{1}{2}$ mi. N. of the Jefferson Co. line C.M. 28397.

FOREST: E. bank of Allegheny River, 12 mi. N. of Tionesta C.M. 26851-84, 28131-36.

JEFFERSON: $5\frac{1}{2}$ mi. N.E. of Sigel C.M. 28143-55, 28197, 28243; Cook's Forest C.M. 28954.

McKEAN: 4 mi. N.E. of Clermont C.M. 28740.

MERCER: 2-3 mi. N. of Grove City C.M. 28633.

VENANGO: 9 mi. E. of Oil City, near U.S. route 62 C.M. 27027-29, 27037; 1 mi. S.W. of President C.M. 27038-41; 1 mi. N.E. of Franklin C.M. 27732.

WARREN: *circa* $2\frac{1}{2}$ mi. N.E. of Tidiute, near U.S. route 62 C.M. 26886-87, 27093; $11\frac{1}{2}$ mi. N.E. of Tidiute, near U.S. route 62 C.M. 26888; 15 mi. N.E. of Tidiute, near U.S. route 62 C.M. 26889-98; 6 mi. W. of Warren, on the bank of the Allegheny River C.M. 27691-98; 4 mi. S.W. of Youngsville C.M. 27702; *circa* $\frac{3}{4}$ mi. N.W. of Pittsfield C.M. 27673-76, 27726-28; 4 mi. N. of Pittsfield C.M. 27710; 5 mi. N.W. of Pittsfield C.M. 27729; 6 mi. N. of Pittsfield C.M. 27734; 5 mi. E. of Columbus C.M. 27685-87; Benson's Swamp, 2 mi. E. of Columbus C.M. 27678; Sheffield C.M. 27505-12, 28662; 2 mi. S. of Sheffield C.M. 26899-916.

In addition to the foregoing, the following specimens were measured for total length only, and this value was applied in the preparation of table 3 (Growth and Age Groups):

CRAWFORD: Titusville C.M. 29870-71.

ERIE: 1 mi. E. of Corry, near U.S. route 6 C.M. 29881-82.

FOREST: 2 mi. N. of Tionesta, near U.S. route 62 C.M. 32232.

McKEAN: Morrison C.M. 29631; 6 mi. N.W. of Kane, near Pa. route 68 C.M. 29628.

VENANGO: "Ten Mile Bottom", 4 mi. N. of Van C.M. 32207-09; 2 mi. N.W. of Coal Hill C.M. 32199, 32201.

WARREN: Sheffield C.M. 29737-38 (A-G), 29796-802, 30042; Corydon C.M. 32238-40; 10 mi. S.W. of Warren, near U.S. route 62 C.M. 32245, 32247-49 (A-L), 32251-52 (A-H).

For statistical methods I have followed Arkin and Colton (1950), except for the coefficient of divergence which was introduced by Klauber (1940), and for Fisher's "t", which was taken from Snedecor (1946).

Scutellation

Dorsal Scale Rows

Unlike the sample *brachystoma* studied by Smith, where the number of scale rows was quite constant, the present series exhibits considerable variation (Table 1). Scale rows were counted one head's length behind the head, at midbody, and approximately a head's length anterior to the vent.

Table 1. Variation in number of dorsal scale rows

Scale row formula	f	Per cent of sample
17-17-17	118	76.7
17-19-17	17	11.0
17-17-15	13	8.4
17-17-16	2	1.3
19-19-19	1	0.6
19-17-17	1	0.6
18-18-17	1	0.6
17-18-17	1	0.6

Supralabials

In the present series, 90.3 per cent (139 individuals) possess six supralabials on each side of the head; 3.2 per cent (5) are bilaterally asymmetrical in having six on one side and seven on the other; 2.0 per cent (3) have six on one side and five on the other. Thus it is that 95.5 per cent of the sample have six supralabials on at least one side of the mouth. Of the remainder, 3.2 per cent (5) have seven of these scales on each side; 0.6 per cent (1) has five on each side, and one aberrant specimen (C.M. 27029) has seven on the left side of the head and six full labials on the right, with an additional small scale, which fails to reach the lip, interpolated between the fifth and sixth full scales. Should this scale be counted, this specimen would be added to those listed above bearing 7-7 supralabials; should it be ignored, the count would be 7-6. Counting supralabials in this species is complicated by the fact that many individuals have large labial-like scales continuing in series behind the last true supralabial. Therefore the arbitrary rule was set that the posteriormost labial in contact with a temporal was the last one counted. Without such a criterion, one could defend several different supralabial counts for a single specimen.

Infralabials

In ascertaining the number of infralabials, the posteriormost scale having a point of contact with a supralabial when the mouth was closed

was the last one counted, as again a series of labial-like shields extended behind the last true lower labial. Applying this rule, eight infralabials proved to be the number most frequently encountered, 35.0 per cent (54) showing this number bilaterally, 26.0 per cent (40) having eight on one side but seven on the other, 7.1 per cent (11) having the combination eight with nine, and 1.3 per cent (2) eight-six. Thus 69.4 per cent of the sample have eight infralabials at least unilaterally. Seven lower labials are born by 50.6 per cent of the sample in the following combinations: seven-seven, 19.5 per cent (30); seven-eight, 26.0 per cent (40); seven-six, 4.5 per cent (7); and seven-five, 0.6 per cent (1). Only 3.2 per cent (5) have six infralabials on each side; 1.3 per cent (2) shows the combination six-five; one specimen shows nine-nine and one, nine-ten.

Oculars

Less variation is displayed in the number of preoculars, where 81.2 per cent (125) have only one on each side, 11.0 per cent (17) have two on each side, and 7.8 per cent (12) show the combination one-two.

The number of postoculars in *brachystoma* is commonly two or three, with 38.9 per cent (60) of this series having three on each side, 30.5 per cent (47) having two on each side, and 28.6 per cent (44) having the combination three-two. In two specimens (C.M. 26911, 28150) the postoculars on one side of the head are fused into a single high, curved scale. These two specimens show the formulae two-one and three-one. One lone example shows the combination three-four.

The wide range in the size of these various head scales, the large number of abnormalities and the subsequent variation in head scale counts impress one who is working with this species. Such wide variation is frequently encountered in small snakes and seems to be associated with a reduction of head size.

Ventral and Subcaudal Scutes

A summary of data regarding ventral and subcaudal scutes is presented in table 2. The ventrals of males are more numerous than those of females, the coefficient of divergence being 2 per cent. Notable sexual dimorphism is to be found in the number of subcaudals, where the males possess many more scutes (C.D. = 14.99%). The range in this character for males, from 63 to 75, only slightly overlaps the range for females, from 53 to 64. The subcaudal count proves to be the best single character for sexing individuals of this species. It has, of course, the advantage of remaining constant throughout the life of the snake, whereas the next best index for determining sex, the ratio of tail length to total length, is unreliable with small individuals. Since the terminal spine in *brachystoma* seems to include elements from both the left and right rows of subcaudals, this spine has been counted as a caudal on both sides.

A large number of unusual arrangements of ventrals and caudals was noted through this sample. Nine specimens have one or more caudals undivided at the midline, so that an entire ventral-like strap extends across the underside of the tail. In some of these specimens there are as many as five or six such anomalous caudals scattered among normally divided scutes. In two specimens, a number of the ventral plates

are divided along the mid-ventral line, giving completely separated left and right elements. Their positions indicate that they are not merely the results of umbilical scars. In twelve more individuals there are similarly divided ventrals, but in these the situation is further complicated by the interpolation of a small additional scute on one side or the other which extends, caudal-like, only from the mid-ventral line to the first dorsal scale row. In eight more snakes, one or more ventrals is split crosswise, usually from one end to the mid-line, but sometimes even farther. It is remarkable, then, that 19.5 per cent (30) of this sample has some abnormality in the conformation of some of the ventral or subcaudal scutes. This may possibly suggest some instability in the genetic pattern of this form.

Throughout the sample the anal is entire, and the dorsal scales (with the exception of those in the first row on either side) bear weak keels.

Location of the Lateral Stripes

Many authors have pointed out the importance of the location of the lateral stripes as a key character in distinguishing between various members of this genus. Smith (1945, 140) has previously reported that in *brachystoma*, "The stripes are on the 2nd, 3rd, and 4th rows anteriorly always, posteriorly it may be on 2 and 3." My observations differ sharply from Smith's. In the present sample, 87 per cent (134) possess the lateral stripe throughout the entire length of the body on scale rows two and three only; 6.5 per cent (10) have the stripe on row three and the adjacent portions of rows two and four at midbody, but only on two and three both anteriorly and posteriorly; 2.6 per cent (4) have the stripe on rows three and adjacent two and four through the anterior portions of the body, but only on rows two and three posteriorly; 1.9 per cent (3) retain the stripe on upper two, three, and lower four through the entire length; in two individuals the stripes are undiscernible; and in the remaining specimen the stripe is found on upper one, two and three in the anterior portions of the body, and on two and three only posteriorly.

Size and Growth

There have been no reports published from field studies on the growth of short-headed gartersnakes, and so deductions made from the present sample are of interest. In table 3, 194 snakes have been arranged in three groups according to the time of year in which they were collected. The last third of the growing season, from September 1, to the onset of the next growing season, in mid April, was selected as the first division. The first third of the growing season, from April 15 to June 30, composes the second division; the middle third, from July 1 to August 31, makes up the remaining section. Divisions between age groups are sharp and clear only in the first year, and then individual differences in growth rate befog the picture and permit only approximate partitions. It seems clear, however, that *brachystoma*, like many small snakes of temperate climes, approximately doubles its natal length during the first year of life, that it reaches mature dimensions at the end of the second year and then increases in length but slowly during its remaining life. It is also to be noted that the two sexes increase in length

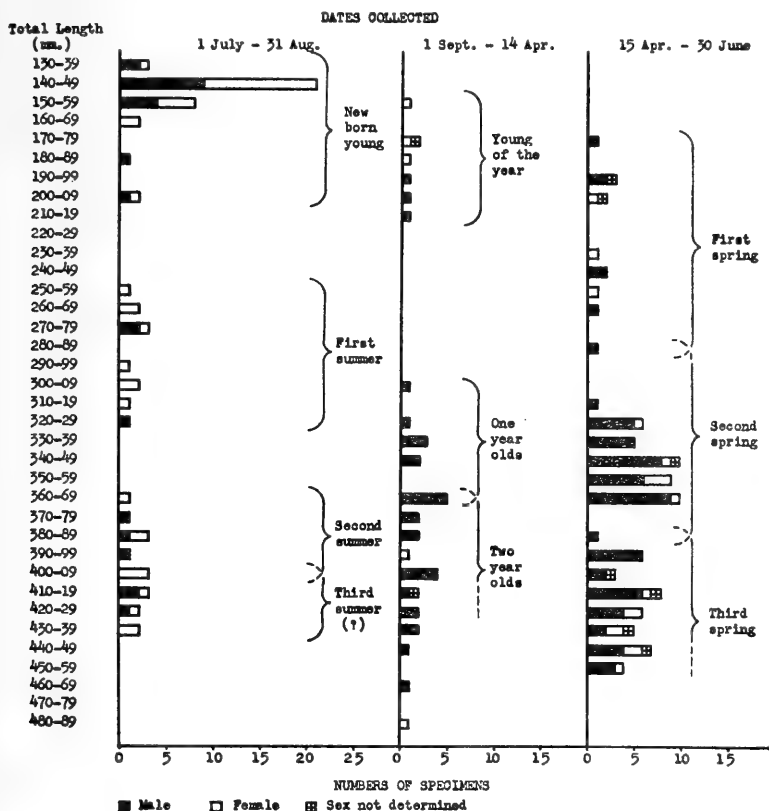
Table 2. Variation and sexual dimorphism in *brachystoma*

Character	Sex	N.	Min.	Max.	Mean	Standard Deviation	V.	Coefficient of Divergence (in %)
Ventrals	♂	112	134	144	139.12±.20	2.17±.14	1.56±.00	
	♀	33	131	140	136.36±.46	2.63±.32	1.93±.01	2.00
Caudals	♂	98	63	75	68.91±.27	2.67±.19	3.87±.01	
	♀	32	53	64	59.30±.43	2.43±.30	4.09±.03	14.99
Proportion of tail (In % of total length)	♂*	91	23.2	27.7	25.95±.08	0.78±.06	3.01±.01	
	♀	32	20.3	24.5	22.61±.18	1.00±.12	4.42±.01	13.76
Proportion of tail (In % of BODY length)	♂*	91	31.6	38.4	35.03±.17	1.61±.12	4.60±.00	
	♀	32	26.1	32.5	29.68±.32	1.83±.23	6.17±.07	16.53

*Only males with total lengths exceeding 230 mm. are included.

at approximately the same rate, and that no sexual dimorphism in size is apparent from these data.

Table 3. Growth and age groups



Smith (1945, 149) states that the largest specimen he examined was a female from near Tionesta, Forest County, Pennsylvania, which measured 506 mm., of which 118 mm. was tail. The smallest specimen in my study group is a male (C.M. 29802), collected on 17 August, 1951 at Sheffield, Warren County, Pennsylvania, which has a total length of only 135 mm. In three litters of new born young produced in the laboratory and preserved at once, the average length of the 12 males was found to be 146.4 mm., while for the 15 females the average was 146.0 mm. Two of these litters have already been mentioned by Richmond (1954, 257).

Comparison Between *brachystoma* and *butleri*

In the new light shed upon the situation by the foregoing, let us now reexamine Conant's thesis (1950, 76) that "In view of the marked

difference between them, plus the fact that there is no evidence of an intergrading population, *butleri* and *brachystoma* should be considered as distinct, although related, species." Conant considered this question in each of five areas, which we shall review in order:

Relative Head Width

Conant (*supra cit.*, 75) states, "—its (*brachystoma*'s) head is quite narrow and is not wider than the neck as is the case in *butleri*." Yet Smith (1945, 150), while deliberately seeking out differences to present in his paper separating the two forms, was forced to admit, "The head size of both species was checked, and the difference in size of the head is so small that it is hardly recognizable as a distinguishing character." Conant, too, had written earlier (1938, 96) that in *butleri* the head was small and "but little distinct from the neck."

An examination of the two forms side by side suggests that the difference in head proportions is not so much one of width as of length. As Cope observed in assigning the specific name *brachystoma*, the head of this form is proportionately shorter than that of *butleri*.

Dark Spots

Conant (1950, 75) argues that "In *butleri*, also, there *very often* is evidence of dark spots between the longitudinal stripes; these are lacking or only *faintly indicated* in *brachystoma*." In referring to these same spots in *butleri*, Conant (1938, 97) had previously noted that the spots are "*obsolete in a majority of specimens*," even though "readily apparent in others." (Italics mine.) Thus it is seen that in both forms the spots are absent from the pattern of the majority of specimens, or are only faintly indicated.

Number of Dorsal Scale Rows

In considering this character, Conant quoted Smith's 1949 contribution, which indicated that differential numbers of scale rows formed a sharp line of division between *butleri* and *brachystoma*. An examination of table 1 in the present paper will reveal that no such sharp line exists, but rather that the two populations gradually merge in this character; that 11.6 per cent of the *brachystoma* in the series under study possess 19 scale rows at midbody, an arrangement previously thought to be almost exclusively characteristic of *butleri*.

Number of Supralabials

The number of supralabials is six in 39 per cent of *butleri*, and seven in 57 per cent (Smith, 1945, 150). *Thamnophis brachystoma* is less variable in this regard, since 95.5 per cent of this study group bear six supralabials, and 6.5 per cent bear seven on one or both sides of the head.

Separation of Ranges, and Absence of Intergrades

Thamnophis butleri is regarded by Thomas (Conant, Thomas and Rausch, 1945, 67) as a pre-glacial "endemic to the eastern part of the Prairie Peninsula—. It may be considered as a relict of a former climate—. It seems altogether likely that *butleri*—existed prior to the Wisconsin glaciation somewhere near its present range, as postulated by Schmidt (1938). Persisting throughout Wisconsin times beyond the

periphery of the ice sheet, it may have spread into the glaciated portions of the Prairie Peninsula soon after the retreat of the ice."

There is unanimity that *brachystoma*, like *butleri*, is a pre-Wisconsin endemic, and Netting is quoted by Conant (1950, 76) as being of the opinion that "This snake may be a relict almost in situ, and—may have existed during Wisconsin times in essentially the same area which it now occupies." This is possible because, as Richmond's distributional report (1952, 315-16) so clearly demonstrates, *brachystoma* is almost entirely "restricted to one physiographic section, the (unglaciated) Allegheny High Plateaus Section of the Appalachian Plateaus Province."

It is my belief, therefore, that before the Wisconsin glacial advance, *brachystoma* and *butleri* were members of a single species occupying a continuous geographical range, but the glacier's advance forced the main body of the species to retreat ahead of it to a point south of its terminal moraine, meanwhile leaving the segment of the population which has become *brachystoma* isolated in its high plateau locale. Due to pressures, competitive or climatic, *butleri* later migrated northward and has come to occupy primarily glaciated territory. That it has failed to reclaim all of its pre-glacial range should occasion no astonishment. As has been noted, it has failed by only about 90 miles to reclose the gap dividing it from *brachystoma*. Since the latter has remained virtually stationary during and since the Wisconsin, it likely is morphologically nearer the pre-glacial stock, whereas *butleri* has possibly evolved slightly more to fit it to the new demands of its glacier-modified habitat.

The belief that *butleri* and *brachystoma* were once one single form is supported by the fact that the most *butleri*-like *brachystoma* are those from the southern and southwestern borders of the present range, the area presumably last in contact with *butleri*. Typical *butleri* characteristics (namely, scale rows 19 at midbody, seven supralabials, lateral stripes invading the fourth scale row) are possessed by more than twice as many specimens from this area as those from the remainder of the range. While this finding must at present be regarded as tentative due to incomplete sampling, the fact that one third of the southwestern *brachystoma* show one or more of these *butleri* characters is strongly suggestive, and were the two forms in geographical contact, it is possible that this section would be regarded as an area of intergradation.

For a summary of other points for comparison, see table 4.

Conclusions

Application of Fisher's "t" test to comparable sets of data from *butleri* and *brachystoma* demonstrates conclusively that the two constitute separate populations. The question as to whether they be two discrete species, or merely two races of a single species having discontinuous ranges is a moot point. It is clear that two races of one single species can exist with definite gaps separating their geographical ranges. Indeed, if our present concept of the mechanics of speciation is correct, it is inescapable that such a condition must sometimes exist. During the long period of time following the isolation of one segment of a population from others of its kind, while the gradual accumulation of changes in its genetic pattern is developing to the point where they

are great enough to render it a recognizably distinct species, that population must of necessity belong to the species from which it has been isolated. The position of the final point of departure in such a situation, that point where the isolated population ceases to be conspecific with the parent stock, depends ultimately upon a subjective evaluation by the reviewer, colored by his own species concept. While caution must be exercised in the erection and continued recognition of species, it seems advisable in the absence of concrete contrary evidence to allow the present practice of regarding *butleri* and *brachystoma* as distinct species to continue unchanged.

Acknowledgments

I am indebted to Dr. M. Graham Netting and Mr. Neil D. Richmond of the Carnegie Museum who have made the Carnegie collections and laboratory facilities available for this study, and who have offered most constructive suggestions. Messrs. Robert G. Ward and Robert Riley have kindly prepared Table 3 for reproduction.

LITERATURE CITED

- Arkin, Herbert, and Raymond R. Colton. 1950. Statistical methods as applied to economics, business, psychology, education and biology. Ed. 4, rev. Barnes and Noble, New York. xiv + 224 + 47 p.
- Conant, Roger. 1938. The reptiles of Ohio. Amer. Mid. Nat. 20 (1): 1-200.
- . 1950. On the taxonomic status of *Thamnophis butleri* (Cope). Bull. Chicago Acad. Sci. 9 (4): 71-77.
- . 1951. The reptiles of Ohio. Ed. 2. Amer. Mid. Nat. suppl.: 201-284.
- , Edward S. Thomas and Robert L. Rausch. 1945. The plains garter snake, *Thamnophis radix*, in Ohio. Copeia (2): 61-68.
- Klauber, Laurence M. 1940. Two new subspecies of *Phyllorhynchus*, the leaf-nosed snake, with notes on the genus. Trans. San Diego Soc. Nat. Hist. 9 (20): 195-214.
- Richmond, Neil D. 1952. First record of the green salamander in Pennsylvania, and other range extensions in Pennsylvania, Virginia and West Virginia. Ann. Carnegie Mus. 32: 313-318.
- . 1954. The ground snake, *Haldea valeriae*, in Pennsylvania and West Virginia with description of new subspecies. Ann. Carnegie Mus. 33: 251-260.
- Ruthven, Alexander G. 1908. Variations and genetic relationships of the garter snakes. Bull. U. S. National Mus. (61): vii + 201 p.
- Schmidt, Karl P. 1938. Herpetological evidence for the postglacial eastward extension of the steppe in North America. Ecology 19 (3): 396-407.
- Smith, Albert G. 1945. The status of *Thamnophis butleri* Cope, and a redescription of *Thamnophis brachystoma* (Cope). Proc. Biol. Soc. Washington 58: 147-154.
- . 1949. The subspecies of the plains garter snake, *Thamnophis radix*. Bull. Chicago Acad. Sci. 8 (14): 285-300.
- Snedecor, G. W. 1946. Statistical methods applied to experiments in agriculture and biology. Ed. 4. Iowa State Coll. Press, Ames. 485 p.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW SPECIES OF *CINARA* FROM ARIZONA
(APHIDAE)

BY F. C. HOTTES

The two species described herewith, were sent me as immature specimens by Mr. Dennis Grassi who collected them on branches of *Pinus edulis* near Springerville, Arizona. It is a pleasure to acknowledge his assistance. It was not until one of the species had been determined as new, that I became aware of the fact that I had taken three specimens a year earlier.

Cinara rustica s.sp.

Oviparous female.

Size and general color:—Length from vertex to end of anal plate varying from 3.00-3.33 mm. Head black slightly powdery. Prothorax black with a few spots of powder. Meso and metathorax black mottled with powder. Anterior portion of abdomen black, almost free from powder, whatever powder is present is confined to a small amount at sides and an indistinct powdery median stripe. Just anterior to the cornicles there is a wide band of powder. The cornicles are black. Median to the cornicles there is an indistinct powdery stripe. Surface of abdomen not powdery reticulated, somewhat rough, and with some polish. Posterior portion of abdomen faded black with a greenish tinge. Ventral surface of abdomen powdery, not banded at rear. First antennal segment concolorous with head, second and third antennal segments pale dusky and uniform in color, fourth and fifth antennal segments pale dusky with ends much darker, sixth segment uniform dark dusky. Metathoracic femora pale at base to about middle, remainder much darker. Hind tibia with short region near base dusky, this followed by a region which is dusky yellow, this region is followed with dark dusky. Tarsi dusky. Cornicles with constricted area much darker than basal region. Posterior to the cornicles there are a few irregular shaped pigmented spots. Anterior to the cauda there are two pigmented spots.

Head and thorax.—Antennal segments with the following lengths: III .34-.375mm., IV .135-.15mm., V .15-.18mm., VI .075-.10 + .03mm. Third antennal segments may be without sensoria, or with one, the fourth antennal segment has the primary sensorium only, the fifth segment has the primary and one secondary sensorium, both of these are large and have wide rims. Antennal hair moderately numerous, fine, and with exceptions almost at right angles to segment. On the third segment the hairs vary in length from shorter, to just longer than width of segment.

Extended rostrum reaching about to cornicles, last three segments with the following lengths: .21, .19, .08 mm. Hairs on metathoracic femora fine, at right angles to segment, varying in length from much shorter than half width of segment to just under one half width of segment. Hind tibiae varying in length from 1.68-1.80 mm. Hind tibiae only slightly swollen, what little swelling present on basal half of segment. Sensoria on tibiae not typical, not tuberculate, few in number, and very difficult to differentiate, one has the feeling that they are present even if they can not be seen. Hair on metathoracic tibiae numerous, fine, up-standing except at apex, all shorter than width of segment, many shorter than half width of segment. Mesosternal tubercle absent.

Abdomen.—Outer margin of cornicles varying from .40-.48mm. irregular in outline, cornicles with few hairs which are quite uniform in distribution. The cornicle hair are slightly longer than the hairs on the dorsum and like them fine. Pigmented spots anterior to cauda with a single row of hairs on the median posterior margin and two rows of hairs more laterally. Cauda clear at base, pigmented portion of cauda setulose, hairs confined largely to the posterior margin, few in number.

Apterous viviparous female.

This form is described from four specimens, none perfect, having been removed from slides of *C. edulis* (W) taken in same region as oviparous females. Color in life not noted. Length from vertex to end of anal plate varying from 3.225-3.37mm. Antennal segments with the following lengths: III .345-.42mm., IB .15-.18mm., V .195-.21mm., VI .09 + .03-.045mm. Secondary sensoria distributed as follows: III 0-1, IV 1, V 1, primary sensoria present on third, fourth and fifth segments. All antennal segments smooth. Hair as in oviparous female. Last three segments of the rostrum with the following lengths: .195-.21, .18, .075mm. Ocular tubercles small. Mesosternal tubercle absent. Cornicles black with few hairs, outer margin of cornicle very irregular. Dorsum of abdomen reticulated. Region of abdomen between cornicles dull in color and slightly darker than rest of abdomen. Dorsum of abdomen with few hairs distinctly fewer than on ventral surface, but of same type and about the same length. Pigmented areas anterior to cauda divided, with single row of hairs on the posterior margin, anterior to these areas, there are two, more or less extensive pigmented areas. All four pigmented areas with a setulose surface. Cauda rather short, much narrower than anal plate. Genital plate with very few hairs, mid anterior region free from hairs.

This species keys to *Cinara burrilli* (W) in Palmer's key to the genus *Cinara* in "Aphids of the Rocky Mountain Region." Although the oviparous female of *burrilli* has not been described, it is thought to differ considerably from that species. For example the hair of *burrilli* are fewer and shorter, the cornicles much less extensive, fewer and less up-standing hairs on the antennae, and different host. Despite the fact that *C. rustica* keys to *C. burrilli* it is perhaps more closely allied to *C. terminalis* G.&P. from which it differs in having many more hairs on antennae and tibiae, shorter hairs on the tibiae, larger cornicles, and in distribution of powder, and in color.

Holotype: Oviparous female, reared on twig of *Pinus edulis* Grand Junction, Colo. Oct. 10, 1955. This specimen was sent me as an imma-

ture specimen, by Mr. Dennis Grassi who collected it on *Pinus edulis* near Springerville, Arizona. Morphotype: Apterous viviparous female, taken on *Pinus edulis* Springerville, Arizona, June 11, 1954. Both types deposited in the United States National Museum. This species feeds on the bark of twigs which are several years old.

Cinara metalica n.sp.

Oviparous female.

Size and general color.—Length from vertex to end of anal plate varying from 3.37-3.60mm. Head thorax and abdomen, anterior to cornicles mottled with mealy powder which is thicker on the abdomen than on the head and thorax. Under the powder and on areas free from it, the color may best be described as a cinnamon-brown with a pinkish cast, this color is reflected onto the powder making it look pinkish. Cornicles with only constricted area dark dusky-brown, remainder of cornicles concolorous with band between cornicles which is light brownish suggestive of velvet. This band has a short median very light stripe of powder. Posterior to the cornicles, the abdomen is a light tan-brown, this area is shining and has a metallic luster, this area is reticulated and has a slight amount of powder in the mid dorsal region. The ventral portion of the head, thorax and abdomen anterior to cornicles is powdery, this powder is carried upwards on the sides of the abdomen as a sharp pointed band. First two antennal segments concolorous with head. Third fourth and fifth antennal segments pale yellow, with apical regions progressively more and more dusky brown. Sixth antennal segment brown. Femora pale on basal half shading to dusky brown. Tibiae dark dusky brown near base becoming yellowish dusky, and shading quickly to blackish-brown. Tars black.

Head and thorax.—Length of antennal segments as follows: III .34-.43mm., IV .10-.17mm., V .18-.25mm., VI .10-.12 + .04mm. Sensoria distributed as follows: III neither secondary or primary, IV no secondary, primary sensorium present or absent, V one secondary, primary present. Hair on antennae moderately few, of various lengths of which only two or three on the third segment are longer than width of segment. Antennal hair fine, set at an angle of about sixty degrees. Primary sensoria on fifth and sixth antennal segments large and with wide rims. Marginal sensoria bunched near primary. Sixth antennal segment much wider proximal to primary sensorium tapering from this region to each end. Median transverse suture well developed very dark. Dorsum of head with few hairs. Head little if any wider than prothorax. No specimen with extended rostrum.

Hind tibiae varying from 1.87-2.35mm. in length. First tarsal segment .09-.11mm. Second tarsal segment. 21-.24mm. in length. Hair on hind tibiae numerous, fine, those on the outer margin slightly longer and more numerous than those on the inner margin. The longest hair are less than half width of tibiae, and are set at an angle of forty-five degrees or less. The sensoria on the hind tibiae are not numerous, they are tuberculate, and scarce beyond the middle. The tibiae are scarcely swollen, and the sensoria are difficult to differentiate.

Abdomen.—The outer margin of the cornicles varies from .24-.30mm. The margin is irregular. The cornicles are two toned, the constricted

area is much darker than the margin, the two regions being incompletely separated by clear areas. The constricted area is acentric in position, being closer to the posterior margin of the cornicle. Hair on cornicles sparse, restricted almost to an irregular row and a double row on the constricted area. Dorsum of abdomen with few hairs, hairs much more numerous on ventral surface. Pigmented spots anterior to cauda rather narrow with a single row of hairs on posterior margin.

Alate male.

This form is described from a single specimen, found dead on the surface of the water in the moat surrounding the cage containing the branch on which it had developed. It was one of two immature males sent me from Arizona. When the two were observed alive the next to the last time, it was noted that they were about to become adult, they seemed very nervous and active, hence they were caged, but the cage was never placed within a moat. The next day one specimen had escaped and extra precautions were taken to prevent the escape of the remaining specimen. At that time it was not suspected that the remaining male was already an adult, with undeveloped wings, but such was the case. This must have been true of the specimen that escaped. It should be noted that this form is described as an alate although the wings are near pads, there is no question that the specimen is adult, as is indicated by the sensoria on the antennae, and the harpagones.

Length from vertex to end of anal plate 2.17mm. Color not closely observed, when alive it is recalled that there was little powder. Length of antennal segments as follows: III .43mm., IV .16mm., V .25mm., VI .12 + .04mm. Sensoria distributed as follows: III 42-45, on this segment the sensoria are very small, almost minute, distributed over most of surface except extreme base, some are larger than others, all are tuberculate. IV six sensoria irregularly arranged, but confined to one side of segment, neither this segment or the third, appear to have primary sensoria, if such are present they are small, and look like secondary sensoria for which they were taken. V three large secondary sensoria arranged in a row, plus primary sensorium. Hair on third antennal segment fairly numerous, quite upstanding, in length about equal to width of segment. Lateral lobes of thorax with many hairs on inner margins. Metathoracic femora 1.01mm. in length, with many fine, upstanding hairs, which are considerably shorter than width of segment. Length of hind tibiae 1.725mm. Hair on hind tibiae numerous, about as long as width of tibiae in mid region, and slightly shorter near the base, near the apex the hairs are slightly longer than the width of the tibiae. Tibial hairs more upstanding near basal region, and forming an angle of about forty-five degrees near the basal region, and forming an angle of about along the anterior margin. Cornicles with base measuring about .255mm. the constricted portion of the cornicle is acentric, being closer to the posterior margin of the cornicle. Harpagones short, bluntly pointed, with many hairs. Cauda with few hairs, confined largely to the posterior margin.

Holotype: oviparous female, Allotype: alate male. Both reared on branch of *Pinus edulis* sent from Springerville, Arizona by Mr. Dennis Grassi. Both slides deposited in the United States National Museum.

Male taken Grand Junction, Colorado, Oct. 5, 1955. Oviparous female taken Grand Junction, Colorado Oct. 3, 1955.

This species known only from the oviparous females and the male, may be distinguished at once from other species on *Pinus edulis* by its color, distribution and extensiveness of powder. Oviparous females are apt to be taken for *C. pinona* H when mounted, perhaps because both species have two toned cornicles. However antennal segments differ in length, the fourth segment being much shorter.

The short fourth antennal segment distinguishes this species at once from *C. edulis* (W) as will be noted in Palmer's key to the genus *Cinara* in "Aphids of the Rocky Mountain Region." It should be noted that Palmer's key is probably not intended to key oviparous females, it may be so used in this case. When so used the species keys to *C. burrilli* (W) more nearly than any other. *C. burrilli* is not known from the oviparous female, I would expect this form to differ from the oviparous form of *burrilli* in number of hairs on the tibiae, the hairs not being so upstanding and in the fourth antennal segment being shorter than the fifth, and in color and powder. Both *Cinara pinona* H and *Cinara metalica* may in life be distinguished at once from *C. edulis* (W) by the color of the tibiae.



PROCEEDINGS
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DESCRIPTIONS OF SOME UNDESCRIBED FORMS OF
CINARA (APHIDAE)

By F. C. HOTTES

As a result of Aphid collecting in 1955 it is possible to add the following descriptions to the known Aphid forms. Two of the forms described were taken by Dr. L. G. Gentner and it is a pleasure to acknowledge his generous help.

Cinara anzai H&E.

Alate male.

Color not observed in life. Single specimen cleared. Head and antennae black. Thorax black. Abdomen with cornicles dark dusky, dorsum with several rows of brownish pigmented spots, some of these appear to surround wax glands. Femora in life most likely black, slightly lighter near base. Tibiae and tarsi uniform black. Length from vertex to end of anal plate 3.37mm.

Antennal segments with the following lengths as follows: III .64mm., IV .25mm., V .31mm., VI .13 + .04mm. Distribution of sensoria as follows: III 82-92, on this segment the sensoria vary slightly in size, all are tuberculate, and cover nearly all of the surface. Hair on the third antennal segment few, very scarce on posterior margin, longest longer than width of segment but less than twice width of segment, all upstanding. Primary sensorium on third antennal segment difficult to differentiate from secondary and may not be present, but mistaken for such. Fourth antennal segment with thirteen secondary sensoria, primary sensorium probably not present, the secondary sensoria on this are lacking on the anterior surface. The fifth segment has seven secondary sensoria, arranged in an irregular row on the posterior margin, the primary sensorium on this segment is large and has a wide rim. Marginal sensoria on the sixth segment few, close to the primary and difficult to differentiate. Width of head through the eyes .75mm. Median transverse suture black, well developed. Lateral ocelli large clear, outstanding because of the dark color of head. Rostrum extending just beyond metathoracic coxae. Ocular tubercles well developed. Second fork of media closer to margin of wing than to first fork. Hind tibiae 2.14mm. in length, hair on tibiae numerous, longer and more numerous on outer margin than on inner, the longest hair about twice width of tibiae. Hair on ventral surface at apex of tibiae short and numerous, the dorsal surface of the tibiae in this region is free from hair. Hair on ventral surface of second tarsal segment very sparse, much shorter than those on the

dorsal surface. Cornicles shallow, outer rim about .375 mm. opening of cornicles acentric.

Allotype alate male. Taken on *Pinus albicaulis* Crater Lake, Oregon, Sept. 2, 1955. Collected by L. G. Gentner. This type has been deposited in the United States National Museum.

Apterous viviparous female.

Dr. Louis G. Gentner who collected the material from which this form is described, describes the color of living specimens as follows "General body color yellowish-brown, varying in darkness in different individuals, disk of dorsum of abdomen with interrupted transverse white powdery lines, producing a whitish and brownish mottled appearance. Cornicles dark, surrounded by a pale area. Appendages light brownish-yellow with distal portion of femora, tibiae and tarsi dark."

Length from vertex to end of anal plate varying from 3.52-3.87mm. Antennal segments with the following lengths: III .60-.63mm., IV .24-.315mm., V .30mm., VI .14 + .045mm. Sensoria distributed as follows: three, with primary only, four, zero to one secondary, plus primary, five, one to two secondary, plus primary. Marginal sensoria small, few in number, not more than four as few as three, arranged in a row very close to the primary, difficult to differentiate in most cases. Extended rostrum reaching to mid region of metathoracic coxae, or with segments three four and five beyond. Metathoracic tibiae varying from 2.62-3.00mm. Hair on tibiae abundant, set at an angle of about forty-five degrees, in length slightly less than width of tibiae, or subequal to width. Hair on tibiae occasionally dull at the tip but not as much as in the case of *C. curvipes* (P). First segment of hind tarsis with about fifteen hairs on the ventral surface. Second segment of hind tarsis with hairs on ventral surface more numerous, finer, and shorter than those on the dorsal surface. First metatarsal segment .11-.13mm., second tarsal segment .27-.33mm. Cornicles varying from .60-.65mm. across outer margin, rather oval in outline with margin rather irregular, but never deeply indented. Mid dorsal region of abdomen posterior to cornicles with about four rather large irregular shaped pigmented spots, these spots may vary in position and size. The two pigmented spots anterior to the cauda with two rows of hairs. Abdomen with numerous long fine hairs. Cauda with basal region pale, hairs on cauda confined largely to margins, the hair on the mid dorsal region few and short. Genital plate crescent shaped with few long hairs confined largely to the ends.

Morphotype apterous viviparous female deposited in the United States National Museum. Taken on branches of *Pinus albicaulis* by beating branches by L. G. Gentner, at Crater Lake, Oregon, Sept. 2, 1955.

Oviparous female.

The color of this form was observed by Dr. L. G. Gentner as similar to that of the viviparous female, except that the tip of the abdomen beyond the cornicles and the under side is solid white due to powdery deposit. Hind tibiae only slightly swollen, sensoria on tibiae numerous, tuberculate, not located on apical fourth of segment, or on the dark portion of the tibiae near the base. Morphotype apterous oviparous female, deposited in the United States National Museum. Data same as for viviparous female.

Cinara wahtolca H.*Alate male.*

Size and general color.—Length from vertex to end of anal plate varying from 2.55-2.85mm. Head, thorax and abdomen, except for cornicles which are black, highly pulverulent, almost mealy. Antennae except for the extreme base of third segment black. Pro and mesothoracic femora black, metathoracic femora with basal half pale, remainder black. All tibiae black, with portion proximal half somewhat lighter in color.

Ocular tubercles extremely small, extended rostrum reaching just beyond cornicles. Antennal segments with the following lengths: III .555-.60mm., IV .25mm., V .27-.33mm., VI .11-.12 + .04mm. Sensoria distributed as follows: III 58-72, most specimens with about 70, IV 13-18 each number represented by one case, most common numbers 14 and 15, VI none. On the third segment the sensoria are extremely tuberculate, cover all sides of the segment and vary much in size, the primary sensorium if present on this segment is like the secondary. The hair on the third segment is sparse, and is set at an angle of about sixty degrees. The sensoria on the fourth segment are irregularly arranged over most of the surface, they vary little in size, the primary sensorium is present, is large and has a wide rim. The sensoria on the fifth segment are confined largely to one side of the segment but are not arranged in a row, the primary sensorium is large and has a wide rim. All segments of the antennae are smooth except for the ends of the fifth and sixth segments which are lightly imbricated. The median posterior lobe of the thorax with few hairs, which are confined to the apical half of lobe. Second fork of media closer to margin of wing than to the first. Hind tibiae varying from 1.96-2.10mm. in length. Hind tarsal segments with the following lengths: .105mm. for the first segment and .225-.25mm. for the second. Hair on hind tibiae fine, not numerous, the longest three times width of tibiae, the shortest longer than width, but less than two times width of tibiae. Hairs on ventral surface of first tarsal segment confined to the apical three fourths of segment. Cornicles shallow with irregular outer rim. Hair on cornicles abundant, irregularly arranged, width of cornicles varying from .25-.30mm. Genital plate long and narrow, hair on genital plate uniformly arranged. Gonapophyses black, provided with medium short hairs.

Allotype alate male, deposited in the United States National Museum. Reared on branch of *Pinus edulis*, Grand Junction, Colorado. Taken Oct. 22, 1955.

Males of this species are extremely active after becoming adult, to obtain them, it was necessary to transfer immature specimens to small branches and cage securely.

Cinara nitidula H.*Apterous male.*

Size and General color.—Length from vertex to end of anal plate varying from 1.30-2.07mm. Free from all powder, shining, as if highly polished, dark tan to brown.

Antennal segments with the following lengths: III .36mm., IV .135-.15mm., V .15-.20mm., VI .09-.10 + .05mm. Sensoria distributed as follows: III 20-29 most abundant on apical half of segment, for the most

part very small, all tuberculate, irregularly arranged. The sensoria should not be confused with the raised clear areas from which the antennal hairs arise. The primary sensorium on the third segment if present is like the secondary. The sensoria on the fourth segment are confined largely to one side of the segment, they vary in size, with at least one rather large, the primary sensorium is present but small. The fifth segment has from four to six secondary sensoria, these are confined largely to one side of the segment, but they are not arranged in a row, the primary sensorium on this segment is large and has a wide rim. The ocular tubercles are large. The extended rostrum may reach almost to the end of the abdomen. The tibiae of the metathoracic legs are 1.35mm. in length. The cornicles vary from .40-.52mm. across their outer margins. The genital plate is long and narrow, it is indented in the center of its anterior margin. Gonapophyses black, small, rather blunt.

Oviparous female.

Similar in all respects, except for the hind tibiae to the apterous viviparous female, and like it shining and free from powder on the dorsum. Hind tibiae varying from 1.65-1.85mm. provided with numerous sensoria. The sensoria are hardly typical, few are tuberculate, most are difficult to differentiate, they extend the full length of the tibiae which are very little swollen. The color of this form may vary from dark tan through dark brown to almost black, the black forms appearing last.

Stemmothers of this species taken May 28, 1955 in the type locality were at first not associated with specimens of *C. nitidula*, they were black, highly polished, with the dorsum of the abdomen reticulated.

Allotype apterous male, reared on branch of *Pinus edulis*, Grand Junction, Colo. Oct. 10, 1955, deposited in the United States National Museum. Specimens of this form because of their small size are difficult to collect. Morphotype apterous oviparous female reared on branch of *Pinus edulis* Grand Junction, Colorado, Oct. 22, 1955. The type of this form has been deposited in the United States National Museum. Apparently alate viviparous females of this species are produced at random throughout the season. *Pinus edulis* is widely distributed in western Colorado, however this species of *Cinara* appears to have an extremely limited range, I have only taken it on four trees all within a small area. Given a branch of its "type tree" or one similar to it, it is very easy to rear, transferred to a branch from a dissimilar tree of the same species it dies. As near as I can determine a tree in order to be a host for this species, must have the terminal branches a deep-yellow, with large yellowish scales at the base of the needles. Trees with the bark of the terminal branches gray or greenish, no matter how vigorous are not suitable for this species. Other species of *Cinara* which have *Pinus edulis* for their host appear to be just as specific in their needs. I suspect that these requirements are in some way associated with the ecological and nutritional needs of the individual species, which the Aphid worker of the future will work out. At present it may suffice, to be aware of the fact that species feeding on *edulis* have definite preferences, and that it is not enough just to look on this host for a given species, but that one must look for trees which meet the requirements of the species looked for.



PROCEEDINGS
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AMPHIBIANS AND REPTILES OF
THE UNGAVA PENINSULA¹

BY FRANCIS HARPER

Knowledge of the herpetofauna of this region has been accumulating for nearly a century, but only a little at a time until the last few years. The contributions of the nineteenth century (Hind, 1863; Packard, 1866, 1891; Stearns, 1883; Turner, 1888) are quite meager. Some of the later ones, likewise, consist of little more than scanty notes on one or two of the species comprising the fauna.

Trapido and Clausen (1938) provide a very useful discussion of all the amphibians and reptiles known from the Ungava Peninsula. Although their own field work barely touched the southwestern border of the peninsula (in the Lake St. John area), they cite records from the literature and list museum specimens from various points along the North Shore of the Gulf of St. Lawrence. Patch (1939; 1949) gives distributional and taxonomic notes on *Rana sylvatica cantabrigensis* from several points in the peninsula. Hildebrand (1949) presents excellent notes on the ecology and development of that species in the Fort Chimo area. Several other recent writers (Patch, 1949; Gabrielson and Wright, 1951; Bleakney, 1955) treat the Wood Frog as a new discovery in that locality, apparently overlooking Turner's report (1888: 82) of "two or three species of frogs," which must have been based upon the Wood Frog alone, and also Polunin's report (1949: 114) of a few "tadpoles" at Fort Chimo in 1946. Backus (1954) provides distributional records and life-history notes for *Bufo* and three species of *Rana*. Bleakney (1955) gives range extensions of eight amphibians in the peninsula. Finally, Logier and Toner (1955) publish an extremely useful summation of distributional records of amphibians and reptiles in all of Canada and Alaska.

The interior of the Ungava Peninsula is still so little known to the general public that it seems desirable to indicate the geographical posi-

¹The present communication represents one of the minor results of my biological investigations in the Ungava Peninsula in 1953. These investigations were supported by the Arctic Institute of North America (through contractual arrangements with the Office of Naval Research) and by the Research and Development Division, Office of the Surgeon General, Department of the Army. The results are being prepared for publication under a grant from the National Science Foundation.

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ton and at least the approximate altitude of the localities where my notes and material were secured:

	Latitude	Longitude	Altitude (feet)
Attikamagen Lake, Northwest Bay	54° 59' N.	66° 41' W.	1,536
Carol Lake	53° 04' N.	66° 58' W.	2,000
Knob Lake	54° 48' N.	66° 49' W.	1,645
Lac Aulneau	57° 01' N.	68° 38' W.	510
Lac La Cosa	54° 52' N.	66° 55' W.	1,590
Mile 224 Airstrip	53° 02' N.	66° 15' W.	1,790
Muriel Lake	54° 01' N.	73° 26' W.	1,100

Attikamagen and Carol Lakes and Mile 224 Airstrip are in Labrador; the other localities, in Quebec.

For marked courtesies and very substantial assistance in my field work, I am indebted to numerous officials and employees of the Iron Ore Company of Canada. Francis McKenzie kindly supplied the Montagnais Indian names of Cope's Toad and the Northern Wood Frog.

Through the courtesy of Dr. Doris M. Cochran, Associate Curator, Division of Reptiles and Amphibians, United States National Museum, I am enabled to add a number of records from material in that institution. My own specimens will be deposited there. Roger Conant has kindly read the manuscript of this paper.

Accounts of Species

Bufo terrestris copei Yarrow and Henshaw. Cope's Toad; Crapaud (French); Nik (Montagnais).

"Hudson Bay Toad" is not a particularly appropriate name for this subspecies. At the time of its original description (Yarrow and Henshaw, 1878: 207; type locality, "Hudson's Bay; James Bay"), and for a great many years thereafter, it was not recorded from any specific locality on Hudson Bay proper. It is only recently that it has been recorded (Netting and Goin, 1946) at a single point on that bay—Great Whale River, far down on the eastern coast.

Yarrow and Henshaw remark (1878: 207): "A large number of specimens collected by Kennerly in the neighborhood of Hudson's Bay are in the Smithsonian collection." It would appear that this statement is based upon specimens of "*Bufo copei*" (USMN No. 5377) collected by Robert Kennicott (not C. B. R. Kennerly) in 1859 at Selkirk Settlement, southeastern Manitoba. (Only two specimens of this serial number remain; perhaps there were more originally.) This locality is scarcely "in the neighborhood of Hudson's Bay," being about 550 miles from the nearest point on it. There may be a little uncertainty about this locality as entered in the National Museum's catalogue (Doris M. Cochran, *in litt.*, January 11, 1956); but, in any event, Kennicott approached Hudson Bay at no nearer point than Norway House, near the north end of Lake Winnipeg (*cf.* Preble, 1908: 70). Apparently Kennerly never was anywhere in the Hudson Bay drainage (*cf.* Hume, 1942: 243-263). Finally, Logier and Toner (1955: 25, map 24) refer most of the records of *Bufo* from southeastern Manitoba to *americanus*, and none at all to *copei*. Thus "Hudson's Bay," as part of the originally designated type locality, would appear to be completely erroneous.

Six specimens were obtained in 1953 at Seven Islands on the Gulf and at Carol, Knob, and Muriel Lakes in the interior; and another individual was observed near Mile 224 Airstrip.

At dusk on May 25 I heard two individuals trilling at a woodland pool north of Seven Islands. It was a calm and almost cloudless evening, with a nearly full moon about two hours high. I estimated the temperature at 55°. The duration of eight almost consecutive trills ranged from 8 to 11 seconds (average, 8.9). The intervals between these trills ranged from 6 to 10 seconds (average, 8.3). On the following morning I found a toad caught in a mouse trap at the mossy edge of this pool, among willow, spruce, Labrador tea, and grass.

On May 28 half a dozen others were trilling at dusk at a meadow pool close to Seven Islands Bay, and they so continued for the better part of an hour, at least. The temperature was estimated at 55°-57°. The trills seemed to last for 10-11 seconds. On the following cloudy morning at 10.55 (temp. about 60°), in the same locality, one or two toads were trilling and one was found in a mouse trap in a little thicket of alder, sweet gale, bunchberry, and grass. No eggs were found in the pool where the toads had been trilling the previous evening. On May 30 two individuals were taken from mouse traps in the same locality. On the same day, in bright sunshine about 1 p. m. (temp. about 60°), a toad was heard trilling east of Seven Islands, probably in an alder swale.

Eleven days after my arrival at Knob Lake, the first *Bufo* was heard during the evening of June 14, at a pool beside the seaplane base. By August the pool contained a good growth of horsetail (*Equisetum limosum*) and bur-reed (*Sparganium hyperboreum*). This single toad gave several trills of approximately 8 seconds' duration about 10.55 p. m. (temp. 55°); several more up to 10.07 a. m. the next day (temp. 72°); and again during the afternoon and evening of the 15th. That sunny day, with a temperature of 77° at 3.57 p. m., was probably the warmest of the season up to that time. Between 3 and 4 p. m. the duration of 21 calls ranged from 4 to 7 seconds (average, 5.6); the intervals between these calls, from 6 to 38 seconds (average, 17.4). After violent rain during the night of June 15, the toad was calling at 7:30 the next morning (temp. about 56°); and again on the 17th about 11:30 p.m. (temp. about 44°). After intermittent rain on June 18, trills were heard from the same pool during the late evening (temp. about 50°); three of them were timed at 10, 12, and 10 seconds. After 5 on the sunny afternoon of June 21 (temp. 62°), seven trills lasted from 4 to 7 seconds (average, 5.4); the intervals between them, from 12 to 22 seconds (average, 16.3). This individual was calling again about 10:50-11:55 p. m. As I stood practically over it, it appeared to be the most brilliantly colored *Bufo* I had ever seen (figs. 1, 2). The black blotches on its distended vocal sac were very pronounced. Kodachromes of the living toad, taken two days later, show that its bright colors occur principally on certain of the lighter areas that are situated between the dark markings. They appear as a sort of ochraceous red at the anterior insertion of the hind limbs, on the under side of the femora, and on the tarsi and toes. There is a similar but paler coloration on the arms and adjacent parts of the dorsum. The upper jaw, the parotoids, and some of the anterior dorsal tubercles are reddish brown.

After collecting this toad on the 21st, I neither saw nor heard others

about Knob Lake; it may have been the only one at the pool. I noticed no particular quality of the voice that would distinguish *B. t. copei* from *B. t. americanus*; but the duration of the trills apparently tends to be shorter in the former, especially if we consider only those at Knob Lake.

This lake was the northernmost point at which I found the species. Another specimen was collected at Muriel Lake on June 29 by Robert Staulker and brought to me by Jean P. Labrecque, both of the RCAF. At Carol Lake I stumbled upon an individual among shrubbery close to the shore in the dusk on September 8. It uttered a few squeaks and chirrups as I handled it. On September 13 Wilfrid Emond captured another in a dwarf birch thicket about 75 feet from the same lake. The final record of the season was obtained on the rainy afternoon of September 19 (temp. 49°), when I found a brightly colored *Bufo* in a "string bog" near Mile 224 Airstrip. Snow had fallen there two or three days previously. The three September records may be indicative of the sort of habitats preferred at the non-breeding season: more or less open forest borders and bogs, rather than deep coniferous timber.

Two males from Seven Islands are a little smaller than one from Knob Lake. (All three exhibit nuptial pads on the first and second fingers.) The throats of the Seven Island specimens, while slightly dusky, are not distinctly spotted. The venter and hind limbs are not so heavily spotted or blotched in these as in specimens from Knob Lake and other interior localities. In color characters the Seven Islands specimens apparently show an approach toward *B. t. americanus* (cf. Logier and Toner, 1955: 26-27, map 25). At the time of capture or field observation I made note of the rich coloration (particularly in the groin and on the hind limbs) of specimens at Seven Islands (male, May 26), Knob Lake (male, June 21), Carol Lake (sex?, September 13), and Mile 224 Airstrip (sex?, September 19). After more than two years in preservative, the specimen from Muriel Lake (female, June 29) has a remnant of such coloration. On the other hand, one of the specimens from Carol Lake (male?, September 8) lacked it in life. Thus the reddish coloration is apparently not a secondary sexual character.

Three males (Seven Islands, May 26 and 29, and Knob Lake, June 21) have, respectively, the following measurements: length (snout to vent), 61, 57, 60; elbow to tip of third finger, 31, 29, 33; intergenual extent, 52, 48, 56; tibia, 24.5, 23, 25.5; whole hind foot, 40, 35, 42. A female (Muriel Lake, June 29)—so determined by lack of nuptial pads on the fingers—is the largest specimen of the series, with the following measurements: 74-36-58-28-46. Two specimens have certain fingers that are represented by mere stubs: the second on the left hand in a male from Seven Islands, and the second on the right and the fourth on the left in a male? from Carol Lake.

The vocal season at Knob Lake seemed to commence at least 20 days later than at Seven Islands (where I had been for three days before hearing the first toad on May 25). In each locality the temperature at the time of noticing the first trills was approximately 55°; but at Knob Lake subsequent trilling was heard at temperatures as low as 44° (June 17) and approximately 50° (June 18), and as high as 77° (June 15). This state of affairs is in substantial accord with my experience with *B. t. americanus* in Massachusetts: "Although the American Toad generally does not commence its song season until the temperature has risen

to about 60°, it will nevertheless continue to trill on subsequent days at considerably lower temperatures'' (Harper, 1928: 5).

A few locality records from the Ungava Peninsula, supplementary to those published by Logier and Toner (1955: 27), may be offered here: Natashquan (J. J. Audubon, in M. R. Audubon, 1897: 366, 371; Townsend, 1918: 64); Northwest River (Kindle, 1924: 38); Paradise River (Austin, 1932: 9); Matamek River, Mary River, and Seal River (Trapido and Clausen, 1938: 120); Lake Albanel (Godfrey, 1949: 8); Mile 134 and Menihek Lake (Bleakney, 1955: 165). In the U. S. National Museum there are about 30 *Bufo* tadpoles (No. 129266), approximately 15 mm. in length, that were collected at St. Lewis River on July 14, 1949, by David C. Nutt.

At Knob Lake this species is close to the southern limit of permanent frost (cf. Thomas, 1953: chart 8-1). Apparently no *Bufo* is able to transcend that barrier.

Rana sylvatica cantabrigensis Baird. Northern Wood Frog; Omatshiskok (Montagnais).

On May 25, at dusk, a Wood Frog was calling at the same woodland pool as some Cope's Toads, near Seven Islands. The note sounded like *ctuck, ctuck, ctuck*; *ctuck, ctuck* (three and two in a series). Then nine additional consecutive calls consisted of two notes (five times) or three notes (three times) or just a single note (once).

The species was next heard on June 5 at a marshy pool beside the seaplane base at Knob Lake, where it was also joined in vocalizing by *Bufo* at a later date (June 14). The guttural notes (mostly single) sounded at 10:35 p. m. (temp. 34°). There was a nearly cloudless sky and a northerly breeze; most of the nearby lakes were still partly covered with ice. It is a hardy frog that will prepare for breeding under such conditions. The calling on the 6th seemed to commence about 1 p. m. in broad sunshine, with a little wind and at a temperature of 52°. A number of frogs were sprawled out singly on the surface of the pool, which was about 6 inches deep; their arms were dangling pretty straight downward, while their legs were widely spread. The clucks were generally uttered singly, but were occasionally extended into a rapid series of seven or eight or more notes. The sound here took on a rolling or rattling character: *c-r-r-uck*. The frog was apt to start swimming ahead as it clucked, at least when it gave more than one note in a series. There were evidently no regular intervals between the calls; these seemed to be given just as the mood happened to strike the frog. The calls continued during the evening, 8 to 11:30 p. m.

On the following balmy, sunny, and comparatively calm day (estimated temp. at 8 a. m. 57°) no voices were heard from this pool until toward evening; then, from about 7 to 11 p. m. (estimated temp. 50°), there was active calling. During the afternoon a Wood Frog had been heard at a little pond on the opposite side of Knob Lake. Again on the 8th the frogs in the pool by the camp were heard only from 9:20 to 10 p. m., when rain was falling (temp. about 45°-50°). During snow and drizzle on the 9th silence prevailed until 10:50 p. m. (temp. 41°), when two or three frogs called desultorily. This time the note sounded like *ct-a-ruck*, as it was uttered either singly or in a series of perhaps half a dozen or so.

Whereas *Rana s. sylvatica* in New Jersey evidently prefers the daylight hours for its vocal efforts during the main breeding season in March, its Ungava relatives seem to have a greater liking for the few hours of darkness in June. Thus, on the sunshiny day of June 10 (temp. about 40°-55°) no frogs were heard until evening; they then called actively from 9:50 to 10:40 p. m. (estimated temp. 42°). On the next day several were in voice at 5:50 p. m. (estimated temp. 60°), and there was a strong chorus at 10:50 p. m. (estimated temp. 40°). On the 12th there was a little calling at 10:40 p. m. (estimated temp. 52°); and likewise on the 13th (a mild, sunny day) at 11:07 p. m. On the 14th there was a moderate chorus at 10:30 p. m. (estimated temp. 55°), followed for the first time in this area by the trilling of *Bufo*.

On June 15 there was a little desultory calling in the camp pool at 10:07 a. m. (temp. 72°), and more at 9:40 p. m.; also on the 17th at 9 p. m. (estimated temp. 48°). After intermittent drizzle on the 18th, the clucking was heard from 9:52 to 11 p. m. (temp. 50°-52°). A Wood Frog was seen in a nearby willow swamp on the 19th. Single frogs were calling in the camp pool on the 20th (9 p. m., temp. about 41°), on the 21st (10:50-10:55 p. m., temp. 54°), and on the 23rd—a mostly cloudy day, with intermittent showers (morning and afternoon, temp. 55°). On this last date a mass of eggs, with developing embryos, was floating in the pool; it was about 4 inches in diameter. Two tadpoles, approximately 11 mm. in length, were collected on this date, and a number of others were seen.

On June 24 the following notes were made upon a live male, captured the day before: dorsum, including side of body and upper side of limbs, olive-drab; a much paler vertebral stripe, snout to vent; slightly buffier or browner stripes on the dorso-lateral folds, bordered on each side by narrow black, more or less broken, stripes; half a dozen low tubercles on each side of vertebral stripe; lower half of rump (from a point halfway down the sacral slope to the vent) largely black; each side of body with about eight or nine small tubercles and with a slightly larger number of black spots; a light stripe (of same color as the vertebral) extending along upper side of femur on its distal half, posterior side of tibia, and outer side of tarsus and fifth toe; iris pale golden; black stripe before the eye virtually limited to a narrow streak just below the canthus rostralis; upper margin of jaw pale grayish; preorbital and tympanic areas slightly darker, with dusky spots; a short black stripe at anterior insertion of arm; upper surface of limbs with small black spots; throat and venter pale creamy; under surface of hind limbs pale flesh color.

These notes may be amplified as follows. In the above-mentioned specimen and in another from Lac La Cosa, the triangular area between the eye and the shoulder, including the tympanum, has a ground color similar to that of the dorsum, and is blotched only in part (especially behind the tympanum) with black. In *R. s. sylvatica*, on the other hand, this whole triangular area is more or less solid black. The fairly prominent dark stripe along the lower jaw in *sylvatica* is practically absent in these specimens of *cantabrigensis*.

One or several Wood Frogs were calling in the camp pool at Knob Lake on June 24 in light rain at 10:45 p. m. (temp. 35°), and one or two on the following day at 10:48 p. m. (temp. 40°) and 11:20 p. m. In

early July, at the Northwest Bay of Attikamagen Lake, Douglas Loring caught a Wood Frog, but lost it. At Lac Aulneau Norman Sliter reported frogs calling in a little pond about the middle of June. In a muskeg in that locality, on July 26, I made a vain effort to capture a very small, bright-colored Wood Frog. Robert Slipp spoke of seeing frogs more than once in bogs several miles south of Lac Aulneau. Gilbert Simard presented me with a specimen taken near Lac La Cosa in July. Its arms are far less robust than those of the male of June 23, the webbing of the toes is much less extensive, and the first finger is not swollen—these characters indicating that the specimen is a female. The left leg is a stump, consisting merely of the femur; this has the appearance of being the result of an accident, rather than a congenital defect (*cf.* Trapido and Clausen, 1938: 123).

Extreme temperatures at which I found the species in voice were: 34° (June 5), 35° (June 24), and 72° (June 15). Other records of actual or estimated temperatures ranged from 40° to 60°, slightly more occurring between 50° and 60° than between 40° and 50°.

The measurements of the adult male and the adult female are, respectively: length, 41, 43.5; width of head (at posterior end of glandular fold along jaw), 17, 17; elbow to tip of third finger, 18, 20; intergenual extent, 44, 45; tibia, 21, 23; whole hind foot, 33, 36. These specimens are definitely more slender and lighter in weight than others from northwestern Canada. The weights of preserved specimens (with light paper labels attached) are: one adult male and two adult females from southwestern Keewatin, 8.1, 11.8, and 11.1 g.; one adult male from Churchill, Manitoba, 9.8; two adult females from southern Yukon, 9.4, 10.9; adult male and female (the latter with one leg missing below the femur) from northern Quebec, 6.1, 5.9. Thus the two last weigh only about two-thirds as much as specimens from northwestern Canada. The width of head shows a corresponding but less pronounced difference: six specimens from northwestern Canada, average 18.8; two specimens from northern Quebec, average 17. Some of the other linear measurements of these last average slightly less than those of northwestern specimens.

The following records from the Ungava Peninsula are merely supplementary to those published by Loger and Toner (1955: 37-38) for *R. sylvatica*: Fort Chimo (Turner, 1888: 82—as “two or three species of frogs,” doubtless comprising only the present species); Rapid River (Speck, 1925: 5); Pointe aux Alouettes, Saguenay County, and Val Jalbert, St. John County (Trapido and Clausen, 1938: 123); Tadoussac and Natashquan (Patch, 1939: 235); Fort Chimo (Polunin, 1949: 114—as “tadpoles”); Mud Lake on Hamilton River, and Northwest River (Backus, 1954: 227); Fort McKenzie and Richmond Gulf (Bleakney, 1955: 167).

This is apparently the only amphibian in the peninsula that succeeds in transcending the barrier of permafrost (*cf.* Thomas, 1953: chart 8-1). Noble (1931: 456) would not grant that ability to any amphibian.

It will require only a few lines to list the remaining amphibians and the one reptile known from the Ungava Peninsula (whose southwestern limits I place at the Nottaway and Saguenay Rivers), together with such locality records as have not already been provided by Logier and Toner (1955):

Ambystoma jeffersonianum (Green). Jefferson's Salamander.

Godbout (USNM No. 48055); Seven Islands (Bleakney, 1955: 168, 170). "A lizard five inches long," reported by Hind (1863, 1: 276) from the Ridge Portage in the Moisie River valley, is not likely to have been anything but the present species.

Plethodon cinereus cinereus (Green). Red-backed Salamander.

Eurycea bistineata bistineata (Green). Northern Two-lined Salamander.

Hyla crucifera crucifera Wied. Northern Spring Peeper.

Rana clamitans Latreille. Green Frog.

Seven Islands (Bleakney, 1955: 166).

Rana pipiens pipiens Schreber. Northern Leopard Frog.

Mud Lake (Kindle, 1924: 38); Paradise River (Austin, 1932: 9).

Rana septentrionalis Baird. Mink Frog.

Matamek River (USNM Nos. 73846-73847); Etagaulet Bay, Lake Melville (Backus, 1954: 227).

Packard's report (1866: 272; 1891: 405) of a specimen from Okak is distinctly suspect, despite his statement that it was identified by E. D. Cope. Okak is a far more boreal locality (both geographically and faunally) than any other from which the species has been authentically recorded. Under the heading of *R. septentrionalis*, Packard also remarks that "frogs" were heard and seen by inhabitants "at Stag Bay, just north of Cape Harrison, Domino Harbor, Lewis Bay, and Henley Harbor." No subsequent investigator has found this species at any point on the outer east coast, and the frogs mentioned are much more likely to have been *Rana sylvatica cantabrigensis* (which is quite overlooked by Packard). Hildebrand (1949: 169) and Wynne-Edwards (1952: 24) refer Packard's records to the Wood Frog.

Thamnophis sirtalis sirtalis (Linnaeus). Eastern Garter Snake.

Tadoussac, Matamek River, and 27 miles east of mouth of Romaine River (Trapido and Clausen, 1938: 124). The name of the Rivière aux Coulevres (lat. 50° 06' to 30' N., long. 67° 25' to 29' W.), whose waters reach the Gulf of St. Lawrence through the Rivière Pentecôte, strongly suggests the occurrence of this snake along its banks.

Each of the above-mentioned ten species (three salamanders, one toad, one tree-frog, four true frogs, and one snake) occurs in the Canadian Zone, and probably more or less throughout its extent in the peninsula, although there are comparatively few records of any of the species over the greater part of its more northerly portions. Apparently *Plethodon c. cinereus*, *Eurycea b. bistineata*, *Rana clamitans*, and *Thamnophis s. sirtalis* do not range northward beyond the limits of the Canadian Zone. The same statement may apply to *Rana septentrionalis*.

Among the species of the Hudsonian Zone, *Rana sylvatica cantabrigensis* may be regarded as the hardiest one, for it evidently occurs throughout—and even extends a little distance into the Arctic Zone near Fort Chimo (Gabrielson and Wright, 1951: 128), while *Ambystoma jeffersonianum* barely enters the Hudsonian and *Bufo t. copei* is apparently absent from its more northerly portions. The report of *Hyla c. crucifera* from Menihek Lake (Bleakney 1955: 165) requires confirmation before its acceptance as the only Hudsonian record of that species in the

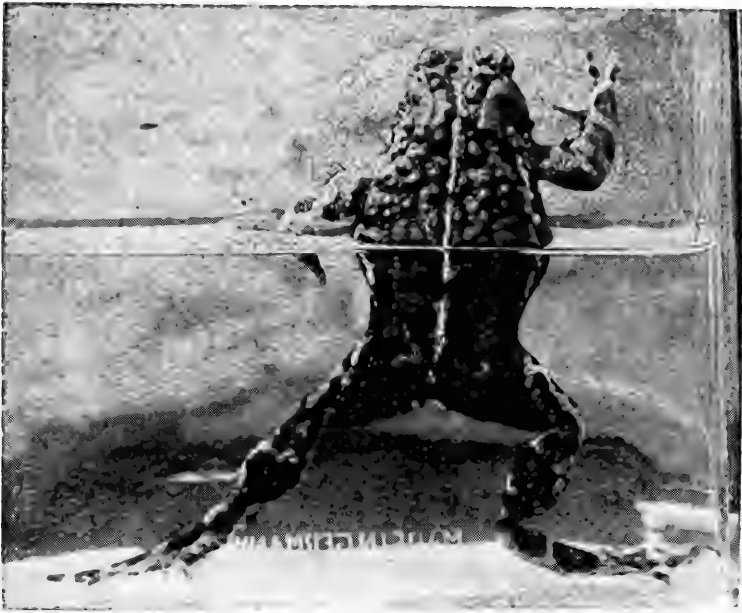
peninsula. If the lower Hamilton River valley is to be considered an outlier of the Canadian Zone, then the only record of *Rana pipiens* in the Hudsonian Zone to date is the one from Paradise River.

The boundary between the Canadian and the Hudsonian Zones, as considered in the foregoing discussion, does not coincide with that boundary as fixed by Merriam, Bailey, Nelson, and Preble (1910). I have proposed (MS) extending it eastward from the south end of James Bay, approximately along the 52nd parallel of latitude, nearly to the Strait of Belle Isle. In southeastern Quebec this means advancing the former boundary about 150 miles northward and 400 miles eastward. The proposed shift in life-zone limits results from the marked amelioration of the climate during the past four decades.

LITERATURE CITED

- Audubon, Maria R., 1897. Audubon and his journals. Vol. 1, New York: xiv + 532, 21 pl., 1 fig.
- Austin, Oliver L., Jr., 1932. The birds of Newfoundland Labrador. *Mem. Nuttall Ornith. Club* 7: [1] + 229, 2 maps.
- Backus, Richard H., 1954. Notes on the frogs and toads of Labrador. *Copeia* 1954 (3): 226-227.
- Bleakney, Sherman, 1955. Range extensions of amphibians in eastern Canada. *Canadian Field-Naturalist* 68 (4): 165-171, 2 maps, "1954."
- Gabrielson, Ira N., and Bruce S. Wright, 1951. Notes on the birds of the Fort Chimo, Ungava district. *Canadian Field-Naturalist* 65 (4): 127-140, 3 fig.
- Godfrey, W. Earl, 1949. Birds of Lake Mistassini and Lake Albanel, Quebec. *Nat. Mus. Canada Bull.* 114: [2] + 43, 6 fig., 1 map.
- Harper, Francis, 1928. The voices of New England toads. *Bull. Boston Soc. Nat. Hist.* 46: 3-9, 3 fig.
- Hildebrand, Henry, 1949. Notes on *Rana sylvatica* in the Labrador Peninsula. *Copeia* 1949 (3): 168-172.
- Hind, H. Y., 1863. Explorations in the interior of the Labrador Peninsula . . . London: 1: xvi + 351, 9 pl., 15 fig., 1 map; 2: xv + 304, 4 pl., 7 fig., 1 map.
- Hume, Edgar Erskine, 1942. Ornithologists of the United States Army Medical Corps. Baltimore: xxv + 583, 1 pl., 109 fig.
- Kindle, E. M., 1924. Geography and geology of Lake Melville district, Labrador peninsula. *Mem. Geol. Survey Canada* 141: ii + 105, 17 pl., 7 fig., 4 maps.
- Logier, E. B. S., and G. C. Toner, 1955. Check-list of the amphibians and reptiles of Canada and Alaska. *Contrib. Royal Ontario Mus. Zool. and Palaeontol.* 41: v + 88, 77 maps.
- Merriam, C. Hart, Vernon Bailey, E. W. Nelson, and E. A. Preble, 1910. Fourth provisional zone map of North America. In Check-list of North American birds, prepared by a committee of the American Ornithologists' Union, ed. 3: frontisp. New York.
- Netting, M. Graham, and Coleman J. Goin, 1946. The correct names of some toads from Eastern United States. *Copeia* 1946 (2): 107.
- Noble, G. Kingsley, 1931. The biology of the Amphibia. New York and London: xiii + 577, 1 pl., 174 fig.
- Packard, A. S., Jr., 1866. List of vertebrates observed at Okak, Labra-

- dor, by Rev. Samuel Weiz, with annotations by A. S. Packard, Jr. *Proc. Boston Soc. Nat. Hist.* 10: 264-277.
- , 1891. The Labrador coast. New York. 1-513, 5 pl., 25 fig., 13 maps.
- Patch, C. L., 1939. Northern records of the wood-frog. *Copeia* 1939 (4): 235.
- , 1949. Further northern records of the wood-frog. *Copeia* 1949 (3): 233.
- Polunin, Nicholas, 1949. Arctic unfolding. London: 1-348, 33 pl., 3 maps.
- Preble, Edward A., 1908. A biological investigation of the Athabaska-Mackenzie region. *U. S. Dept. Agric., No. Am. Fauna* 27: 1-574, 21 pl., 12 fig., 8 maps.
- Speck, Frank G., 1925. *Bufo americanus* in the Labrador Peninsula. *Copeia* 138: 5-6.
- Stearns, W. A., 1883. Notes on the natural history of Labrador. Reptiles and batrachians. *Proc. U. S. Nat. Mus.* 6: 123.
- Thomas, Morley K., 1953. Climatological atlas of Canada. Ottawa: 3-253, 74 charts.
- Townsend, Charles Wendell, 1918. In Audubon's Labrador. Boston and New York: xiii + 354, 34 pl., 1 map.
- Trapido, Harold, and Robert T. Clausen, 1938. Amphibians and reptiles of eastern Quebec. *Copeia* 1938(3): 117-125.
- Turner, L. M., 1888. The physical and zoological characters of the Ungava district, Labrador. *Trans. Royal Soc. Canada* 5, sec. 4: 79-83.
- Wynne-Edwards, V. C., 1952. Freshwater vertebrates of the arctic and subarctic. *Fisheries Research Board Bull.* 94: [i] + 28, 2 fig., 1 map.
- Yarrow, H. C., and H. W. Henshaw, 1878. Report upon the reptiles and batrachians collected during the years of 1875, 1876, and 1877, in California, Arizona, and Nevada. *Ann. Rept. Geog. Surveys of the Territory of the United States west of the 100th Meridian . . . by George M. Wheeler*, appendix L: 206-226.



Figs. 1 and 2.—*Bufo terrestris copei*, ♂ ad. (orig. no. 1331); dorsal and ventral views, in aquarium jar. Knob Lake, Quebec; June 23, 1953.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

SIX NEW SPECIES OF ADELOTHRIPS FROM THE
NEW WORLD WITH CRITICAL REMARKS ON THIS
GENUS AND RELATED GENERA
(THYSANOPTERA: TUBULIFERA)

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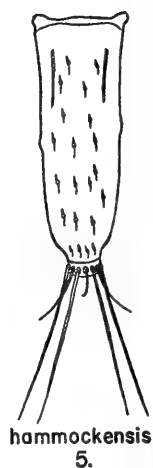
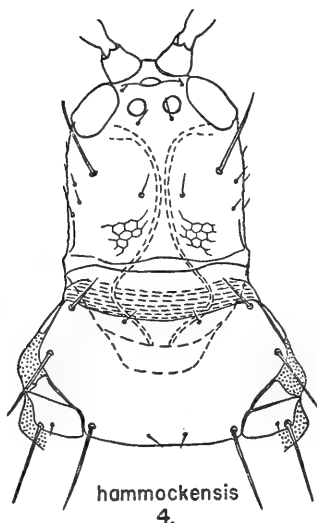
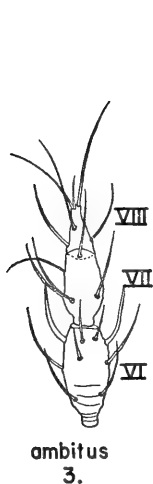
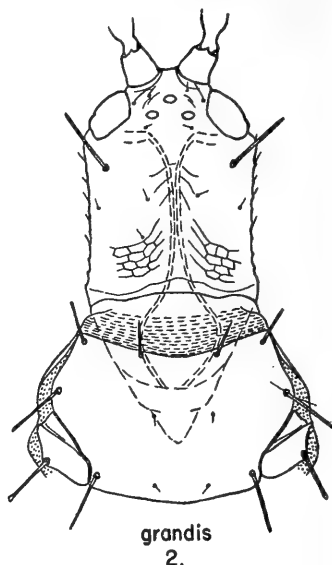
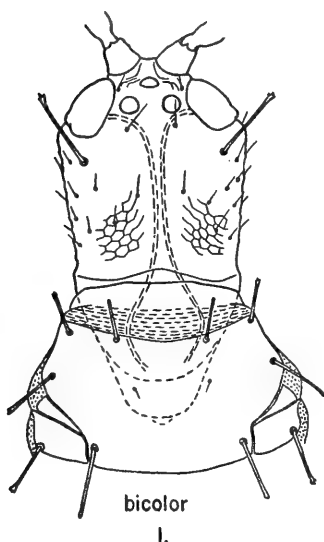
In 1938 Hood proposed the genus *Adelothrips* for the Floridian species *xanthopus*. According to him, *Adelothrips* is "allied to *Polyphemothrips* Schmutz, and . . . will probably embrace about two neotropical and two nearctic forms now known in the literature." In 1952, in a footnote, Hood revealed the names of the two nearctic forms he believed should be included, and at various times Hood and occasionally others added new species to both genera. Up to the present, however, no one has given the chief characteristics that would permit the separation of *Adelothrips* from *Polyphemothrips*, and as a result species have been assigned to either category with some vagary.

During the past few years it has been my good fortune to see or collect the type species of these genera, to examine a number of the previously included or new species, and to study type species of closely related genera. From these studies I learned that *Adelothrips* possibly can be distinguished from *Polyphemothrips* on the basis of the position of the fore ocellus; that *Adelothrips* can be distinguished from *Hoplothrips* on the basis of the width of the maxillary stylets and that, accordingly, *Hoplothrips ambitus* Hinds should be transferred to *Adelothrips*; that the European *Abiastothrips schaubergeri* (Priesner) is possibly a true *Adelothrips*; that *Tropothrips* is a synonym of *Docessis-sophothrips*; and that the six species described herein are apparently new.

The following elucidations of these conclusions will, I hope, help make *Adelothrips* more understandable.

I am obliged to Dr. Floyd Andre, Dean and Director of the Division of Agriculture, Iowa State College, for premission to study a specimen of what is almost certainly *Polyphemothrips braziliensis* Schmutz; to Miss Kellie O'Neill for the loan of specimens, information, and use of the collections in the U. S. National Museum; to the John Simon Guggenheim Memorial Foundation for a grant-in-aid which enabled me to

visit European and African museums; to Dr. J. P. Doncaster of the British Museum (Natural History) for making the type of *Docessis-sophothrips ampliceps* available and for his hospitality; and to Professor Dr. H. Priesner of Cairo for his advice, hospitality, and for giving me free access to his magnificent collection of Thysanoptera.



Adelothrips Hood

Adelothrips Hood, 1938, p. 380. Type species by original designation:

Adelothrips xanthopus Hood.

Characteristics: 1.) Each antenna is usually seven-segmented, when sometimes eight-segmented the last two antennal segments (morphological segments VII and VIII) are extremely closely joined, fig. 3. In a few species these two segments are completely fused except for a ventral spot; in others a thin suture completely separates the two segments, fig. 3; in most, however, a partial ventral suture exists, indicating the division of these segments. 2.) In many species, the antennal sense cones are long and slender. 3.) Usually the posterior dorsal region of the head is swollen, being highest on the meson. Consequently the patterns of reticulation when present are upturned toward the meson, figs. 1, 2, and 4. 4.) Cheek pouches are usually completely absent but occasionally the cheeks are slightly swollen behind the eyes. 5.) The fore ocellus never overhangs the bases of the antennae. 6.) The mouth cone is broadly rounded to pointed, and the attached maxillary palps are usually large. 7.) Each maxillary stylet extends well into the head and is somewhat thickened, more so than as in *Hoplothrips* but not so thick as in *Elaphrothrips*. These stylets are not doubly looped as in *Docessissophothrips*. 8.) Fore wings when completely formed are not indented in the middle and they always bear accessory fringe setae. 9.) Praepectal plates are never present. 10.) Individuals of both sexes bear a prominent tooth on each fore tarsus.

The moderately thickened form of the maxillary stylets is the most distinctive characteristic of *Adelothrips* and the group to which it belongs. Unfortunately "moderately thick" cannot be described except by reference. Therefore, I presume that whoever would have reason to use this paper would have access to common genera of thrips and that it will suffice to say that the moderately thickened stylets found in *Adelothrips* are intermediate in thickness between the thin type found in *Hoplothrips*, *Haplothrips*, and others and between the thick type found in *Idolothrips*, *Elaphrothrips*, *Cryptothrips*, etc. Actually, once seen and compared, this characteristic is recognized with ease.

By these characterizations, *Adelothrips* should include *ambitus* (Hinds) and accordingly that species is herewith transferred from *Hoplothrips*. No species of *Hoplothrips* has moderately thickened maxillary stylets as does *ambitus* and all of the species of *Adelothrips*, *Docessissophothrips*, *Polyphemothrips*, and other relatives.

Abiastothrips schaubergei (Priesner), the only species in its genus, is possibly a true congener of the species now placed in *Adelothrips*. It has moderately thick maxillary stylets; antennal segments VII and VIII are divided by a fine, incomplete suture; and most of its other features are likewise similar to those of *Adelothrips*. By way of differences, however slight they may be, *schaubergei* has smaller maxillary palps than found in most species of *Adelothrips*, and the antennae are inserted farther apart than as in most species of *Adelothrips*. Yet in this latter condition, *schaubergei* approaches that of *ambitus* whose antennae are inserted only slightly less farther apart. Perhaps *schaubergei* is but an odd species of *Adelothrips* and such being the probability, the name *Adelothrips* should be superseded by *Abiastothrips*, the older name.

However, I am reluctant to reduce *Adelothrips* to synonymy at this writing. I had only one look at *Abiastothrips* and in my haste I may have missed some salient or unique diagnostic features. Mostly I hesitate to sink *Adelothrips* because it seems better to avoid changing the generic name of so many species until a firm conviction is reached that the two categories must be considered as one and the same genus. At any rate they are herewith proposed to be closely related, which is my principal contribution to the knowledge of these genera at the moment.

Adelothrips is also close to *Polyphemothrips* in relationship. In those members of *Adelothrips* known to me the fore ocellus does not overhang the bases of the antennae, as is the case in *Polyphemothrips*, and by this characteristic the two may be differentiated. Furthermore, species of *Polyphemothrips* are usually larger in size than species of *Adelothrips*, and the cheek pouches are usually more fully developed than those in species of *Adelothrips*.

By these definitions the Peruvian species *Polyphemothrips minor* Hood and perhaps others that are also unknown to me are not members of *Polyphemothrips* but rather of *Adelothrips*. I have never seen the species *minor* but from its description and illustration seemingly its fore ocellus is not overhanging. According to my contentions the lack of prominent protrusion (the non-overhanging condition) of the fore ocellus is an *Adelothrips* characteristic.

The types of the following new species are deposited in the collections of the Illinois Natural History Survey.

***Adelothrips acutus* new species**

Female (brachypterous).—Length distended slightly less than 3 mm. General color dark brown with much red subintegumental pigment. Antennal segments I and II, the pedicel of antennal segment III, and all tarsi becoming yellowish brown. Tube yellowish orange to yellowish brown in the middle, tipped with gray.

Head longer than wide. Ocelli normal, hardly at all reduced. Post-ocular setae long and pointed at tip. Morphological antennal segments VII and VIII partially separated by an incomplete ventral suture. Antennal segment III with one inner and two outer sense cones.

Prothorax with most major setae long and slightly dilated to pointed at tips. Mid-posterior setae small. Mesopraesternum degenerate. Metathorax not reticulate. Wings reduced to small pads. Fore tarsi each with a well developed slender tooth.

Abdominal pelta triangular. Major posterior setae of abdominal tergite IX long and pointed. Tube about 0.6 times as long as head.

Female (macropterous).—Similar in size, color, and structure to brachypterous female, except for the presence of fully developed wings. Fore wings with six accessory setae.

Male (brachypterous).—Length distended about 2 mm. Color and general structure similar to female. Lateral pair of the major posterior setae on abdominal tergite IX shortened and spinelike. No abdominal glandular areas present.

Holotype.—Female; Mapleton, Illinois; June 2, 1949; (L. J. Stannard); ex: dead willow branches. **Allotype**.—Male; Anderson Lake State Park, Illinois; September 8, 1954; (Ross and Stannard); on

dead willow. **Paratypes**.—1 ♀, 3 ♂; same data as for allotype. 1 ♀; Toledo, Illinois; May 18, 1950; (Sanderson and Stannard); beating dead elm branches. 3 ♀; Siloam Springs State Park, Illinois; August 8-9, 1951; (Richards and Stannard); dead willow.

This species is closely related to *junctus*. These two differ significantly in the form of the tip of each postocular setae, and in the color of the tube. In *acutus*, the postocular setae are pointed at the tips and the middle portion of the tube is yellowish brown. By contrast, in *junctus* the tips of the postocular setae are dilated and the tube is wholly brown.

Adelothrips bicolor new species

Female (macropterous).—Length distended nearly 3 mm. Bicolored brown and yellow. Bright yellow: most of head, antennal segments I and II, fore tibiae, most of metathorax, and basal three-fourths of tube. White to light yellow: mid and hind tibiae and tarsi. Brownish yellow: basal portion of antennal segment III, anterior margin of head, fore femora, mesothorax, anterior of metathorax, anterior segments of abdomen. Brown: tip of antennal segment III and remainder of antennae, prothorax, mid and hind femora, posterior abdominal segments except tube with abdominal segments VII and VIII the darkest. Tip of tube gray. Body with much red subintegumental pigment.

Head, fig. 1, long, about 1.3 times as long as greatest width which is just behind eyes. Ocelli present, not overhanging. Postocular setae long, dilated at tip. Dorsal reticulations upturned on posterior meson. Morphological antennal segments VII and VIII fused except for a small incomplete suture on the venter. Antennal segment III with one inner and two outer sense cones. Mouth cone broadly rounded. Maxillary stylets not doubly looped.

Prothorax with major setae well developed and dilated at tips except for the mid-posterior pair which is seemingly absent. Mid-lateral pair slightly larger than anterior ones. Metathorax faintly reticulate. Fore wings with about nine accessory setae. Fore tibiae each armed with a well developed tooth.

Pelta triangular. Major posterior marginal setae on abdominal tergite IX with mid pair shortened and dilated at tips and lateral pair longer and pointed at tips. Tube less than three-fourths as long as head, slender, not sharply constricted at apex.

Holotype.—Female; Finca el Real, Ocosingo Valley, Chiapas, Mexico; July 1-7, 1950; (Goodnights and Stannard); dead branches.

Although different in color, this species is like *palmarum* Hood from Brazil in that both have the middle pair of the posterior marginal setae of abdominal tergite IX dilated at the tips. By the characteristic of color, *bicolor* is closest to the Venezuelan *sporophagus* described herein, except that in *bicolor* the brown is somewhat more extensive and intensive.

Adelothrips caribbeicus new species

Female (macropterous).—Length distended nearly 3 mm. Color generally bright yellow. Antennae light yellow basally becoming dark brown at apex; segments I, II, and III yellow; segment IV yellowish brown in basal half, light brown in apical half; remaining segments dark brown. Head with a light brown streak across anterior portion.

Mesothorax light brown. Fore wings each with a pale grayish cloud in middle. Tube orange brown tipped with gray. Body with much red subintegumental pigment, heaviest in abdominal segments VII, VIII, and IX, making those segments appear orange.

Head longer than wide, about 1.2 times longer than greatest width which is just behind eyes. Ocelli present, not overhanging. Postocular setae long and dilated at tip. Morphological segments VII and VIII of antennae fused except for a small partial suture on venter, pedicel thick; antennal segment III with one inner and two outer sense cones. Mouth cone broadly rounded. Maxillary stylets long but not doubly looped.

Prothorax with major setae well developed and dilated at tips except for the mid-posterior pair which are minute and pointed at tips. Antero-lateral setae smaller than mid-laterals, subequal to anteromarginals. Mesopraesternum boat-shaped, not degenerate. Fore wings with 7-11 accessory setae. Fore tarsi each armed with a moderate sized tooth.

Pelta triangular. Lateral abdominal setae pointed or dilated at tips. Major setae of posterior margin of abdominal tergite IX long and pointed. Tube slightly over two-thirds as long as head, thickened but not ridged, sharply constricted at apex.

Holotype.—Female; Campeche, Cpe., Mexico; July 5, 1951; (L. J. Stannard); beating dead limbs. **Paratype**.—1 ♀; Key West, Florida; December 28, 1951; (Richards and Stannard); ex: dead branches.

Although similar in many respects to *xanthopus*, *caribbeicus* can be distinguished easily by the thick, heavily sclerotized, orange-brown tube which is constricted at its apex. In color and form, the tube that is characteristic of *caribbeicus* approaches that found in individuals of *hammockensis* and *macrura*; however, in these later thrips each tube is ridged and is longer than the tube borne by specimens of *caribbeicus*.

This is another species which inhabits the Yucatan peninsula and extreme southern Florida. Most likely it will soon disappear from Key West which in recent times has been almost completely stripped of its natural vegetation.

***Adelothrips grandis* new species**

Female (brachypterous).—Length distended about 4 mm. Color almost entirely dark brown. Antennal segment I, tarsi, and base and apex of tube yellowish brown.

Head long, about 1.3 times longer than greatest width which is just behind eyes, fig. 2. Ocelli present, not overhanging. Postocular setae long and pointed at tips. Faint reticulations upturned on middle of the posterior part of the head. Morphological segments VII and VIII of the antennae completely fused; antennal segment III with one inner and two outer sense cones. Mouth cone nearly pointed, fig. 2. Maxillary stylets long but not doubly looped.

Prothorax with all major setae well developed except mid-posterior ones which are minute. All these setae which are well developed with blunt to dilated tips. Metanotum smooth, not reticulate. Each fore tarsus armed with a tooth. Wings reduced to small pads.

Pelta triangular. Major setae of posterior margin of abdominal tergite IX long and pointed. Tube slightly more than one half as long as head, slender, not sharply constricted at apex.

Holotype.—Female; San Cristobal Las Casas, Chiapas, Mexico; July 11, 1950; (Goodnights and Stannard); beating dead branches.

From the literature I would presume that this species is allied to the Peruvian *conicura* Hood in the over-all dark color and somewhat in structure and size. The two can be easily distinguished by the presence or absence of yellow pigments and by antennal characteristics. The species *conicura* is said to have the fore tarsi and antennal segments III and IV yellow and antennal segments VII and VIII completely separated by a suture. By contrast, *grandis* has the fore tarsi and antennal segments III and IV brown, or at most yellowish brown, and morphological segments VII and VIII of the antennae are completely fused.

***Adelothrips hammockensis* new species**

Female (macropterous).—Length slightly distended about 3 mm. Color generally bright yellow. Antennae light yellow basally becoming dark brown at apex; segments I and II light yellow; segment III yellow in basal two-thirds, brown at apex; segments IV, V, and VI brown in apical half or more, bases brownish yellow; terminal segment brown. Mid and hind tarsi nearly white. Tube orange-brown to yellow, tipped with black. Wings pale gray. Red subintegumental pigment located in head below ocelli, in a median longitudinal line in the prothorax, in a transverse band across the entire mesothorax and the anterior part of the metathorax, in a wide band across abdominal segment II (being deepest in color intensity at the sides), in the sides of abdominal segment VII, and in several other abdominal segments as scattered dots.

Head longer than wide, about 1.2 times longer than greatest width which is just behind eyes, fig. 4. Ocelli present, not overhanging. Post-ocular setae long and pointed at tip. Faint dorsal reticulations upturned on posterior meson. Morphological antennal segments VII and VIII fused except for a small partial suture on venter, this combined segment gradually tapered at base; antennal segment III with one inner and two outer sense cones, these cones long and slender. Mouth cone broadly rounded. Maxillary stylets not doubly looped.

Prothorax with most major setae long and pointed at tips. Mid-anterior marginal setae and mid-posterior setae small. Mesopraesternum boat-shaped, not degenerate. Metathorax faintly reticulate medially. Fore wings with 15-16 accessory setae. Fore tarsi each armed with a prominent tooth.

Pelva of abdominal segment I narrow. Lateral abdominal setae long and pointed. Tube as long as or slightly longer than head, thick and heavily sclerotized, ridged at base, and sharply constricted at apex, fig. 5.

Male.—Length distended more than 2.7 mm. Color similar to female but with faint brown on mesonotum and with much more red subintegumental pigment in thorax and abdomen.

General structure similar to female except the mid-lateral, the epimeral, and the posteromarginal setae longer than in female. Lateral posteromarginal setae of abdominal tergite IX exactly like female, not shortened or spinelike. Abdominal sternite VIII without glandular areas.

Holotype.—Female; Everglades National Park, Florida; December 26, 1951; (Richards and Stannard); dead branches on Paradise Key Hammock—near Royal Palm ranger station. **Allotype.**—Male; same data as for holotype.

Point for point, this species seems to be most closely related to the Cuban *Adelothrips macura*. They differ by the size of certain prothoracic setae. According to Hood (1941), in *macura* the anteroangular prothoracic setae are longer than the mid-laterals, and the anteromarginals are not too much smaller than the mid-laterals. By contrast, in *hammockensis* the anteromarginals are small and the mid-laterals are much longer than the anteroangulars.

***Adelothrips sporophagus* new species**

Female (macropterous).—Length distended about 2.2 mm. Predominately yellow but also colored with brown. Most of head, all of antennal segments I to III, bases of antennal segments IV and V, fore legs, and base of tube bright yellow. Metathorax, mid and hind tibiae and tarsi, abdominal segment I, and most of abdominal segments II to VIII lighter yellow. Apex of antennal segments IV and V, rest of antennae, fore part of head around ocelli, prothorax, mid and hind femora, and abdominal segment IX brown. Mesothorax, a broad middle band in each fore wing, sides of the abdominal segments, and tip of tube light brown to gray. Red subintegumental pigment heaviest in head, prothorax, and abdominal segments II and III.

Head long, slightly more than 1.3 times longer than greatest width which is just behind eyes. Postocular setae long and dilated at tips. Ocelli present, not overhanging. Faint reticulations upturned on middle of the posterior part of head. Morphological segments VII and VIII partially fused with only an incomplete ventral suture dividing them. Antennal segment III with one inner and two outer sense cones. Mouth cone broadly rounded. Maxillary stylets long but not doubly looped.

Prothorax with all major setae well developed and dilated at tips, except for the mid-posterior ones which are seemingly absent. Mid-lateral setae just slightly longer than the anterior pairs. Metanotum smooth, not reticulate. Each fore tarsus armed with a small tooth. Fore wings with about five accessory setae.

Pelta triangular. Major setae of posterior margin of tergite IX long and pointed. Tube slightly more than one half as long as head, slender, and not sharply constricted at apex.

Abdomen of holotype filled with fungus spores.

Holotype.—Female; Turmero Edo Aragua, Venezuela; March 4, 1953; (W. H. Whitcomb); ex: "spanish moss."

This species is closely related to its neighboring congener *connaticornis* (Hood)—herein transferred from *Cryptothrips*. Since the species *connaticornis*, known from Trinidad, was so briefly described, and since no specimens are available to me, it is not possible to compare the two adequately. However, in *connaticornis* the ninth abdominal segment is presumably yellow whereas in *sporophagus* this segment is largely brown. By this color characteristic the two species may be distinguished.

***Docessissophothrips* Bagnall**

Docessissophothrips Bagnall, 1908, p. 201. Type species by original designation.—*Docessissophothrips amplexiceps* Bagnall.

Tropothrips Hood, August 1949, p. 70. Type species by original designation.—*Tropothrips borgmeieri* Hood. New synonymy.

Maxillata Faure, November 1949, p. 852. Type species by original designation.—*Maxillata priesneri* Faure. Synonymized under *Tropothrips* by Stannard (1954).

The type specimen, *ampliceps*, is glued to a card and housed at the British Museum (Natural History). Part of the head is hoary with a dead growth of fungus. Because the specimen is dry and unmounted, it is impossible to view the internal maxillary stylets. Despite the fact that the shape of these stylets are undeterminable at present, this specimen has all the other attributes of those species formerly named *Tropothrips*, and *Tropothrips* is hereby relegated to synonymy.

Another specimen that I have seen, a different and undescribed species from Guadeloupe which is in the Priesner collection, is remarkably similar to the type species, *ampliceps*. The principal difference is that the Guadeloupean specimen has a yellow tube whereas the tube in *ampliceps* is brown. The maxillary stylets in the head of the specimen from Guadeloupe are visible and they are several times looped—a feature unique to this group of thrips. This type of stylet has been illustrated by Hood (1949), by Faure (1949), and by myself (1954). I am now fully convinced that *ampliceps* is congeneric with *borgmeieri*, *nigripes*, *priesneri*, and *richardsi*, and that *ampliceps* also will be found to have the typically long, doubly looped maxillary stylets.

Explanation of Figures

- Fig. 1. *Adelothrips bicolor*, dorsal view of head and prothorax.
- Fig. 2. *Adelothrips grandis*, dorsal view of head and prothorax.
- Fig. 3. *Adelothrips ambitus*, terminal segments of right antenna.
- Fig. 4. *Adelothrips hammockensis*, dorsal view of head and prothorax.
- Fig. 5. *Adelothrips hammockensis*, tube.

LITERATURE CITED

- Bagnall, R. S. 1908. On some new genera and species of Thysanoptera. Transactions of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne.—new series, vol. III (1): 183-217. September.
- Faure, J. C. 1949. *Maxillata priesneri*, gen. et spec. nov., a thrips (Thysanoptera) with exceedingly long maxillae. Annals and Magazine of Natural History.—series 12, vol. ii: 851-58. November.
- Hood, J. D. 1938. New Thysanoptera from Florida and North Carolina. Revista de Entomologia, vol. 8: 348-420. June.
- . 1949. Brazilian Thysanoptera. I. Revista de Entomologia, vol. 20: 3-88. August.
- . 1952. Brazilian Thysanoptera. III. Proceedings of the Biological Society of Washington, vol. 65: 141-76. November 5.
- Stannard, L. J., Jr. 1954. *Tropothrips* in North America (Thysanoptera; Phlaeothripidae). Proceedings of the Biological Society of Washington, vol. 67: 81-4. March 22.



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A NEW CRAYFISH OF THE EXTRANEUS SECTION
OF THE GENUS *CAMBARUS* WITH A KEY TO THE
SPECIES OF THE SECTION (DECAPODA, ASTACIDAE)

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The Extraneus Section of the Genus *Cambarus* was diagnosed by Ortmann (1931:96) as follows: "Carapace more or less ovate, depressed, with or without lateral spines. Rostrum with marginal spines. Chelae not very elongated, depressed, and rather broad, but a little more elongated than in the sections of *bartoni* and *diogenes*. Areola more or less wide, and of variable, moderate length. Eyes well developed. The essential character is the *presence of marginal spines on the rostrum*." Within the group he included only two species, *Cambarus extraneus* Hagen (1870:73) and *Cambarus cornutus* Faxon (1884:120), and under the former he listed *Cambarus girardianus* Faxon (1884:117) and *Cambarus jordani* Faxon (1884:119) as synonyms. Only one additional species belonging to this Section has been subsequently described—*Cambarus rusticiformis* Rhoades (1944:133).

The ranges as well as the biology of all of these species are poorly known, and Ortmann's conclusions concerning the identity of the three that he combined under the name *Cambarus extraneus* deserve a careful evaluation based on many more specimens. On the basis of a study of additional specimens of Faxon's *C. jordani*, it seems that Ortmann was in error in concluding that "the single known individual of *jordani* is nothing but one of the many individual phases of *extraneus*." Insufficient data are at hand to re-evaluate the treatment of *C. girardianus*, and Ortmann's designation of this species as a synonym of *C. extraneus* is tentatively accepted. Only one specimen of *Cambarus cornutus* has ever been reported, and since the single individual is morphologically different from its apparent relatives the specific status previously accorded it is accepted here. *Cambarus rusticiformis* appears to be a distinct species, and an appreciable extension of its range is reported below.

The species described here is of considerable interest in that it is the first record of the presence of a member of the Extraneus Section along the eastern slope of the Appalachian system. All of the other species

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are found within the drainage systems of the Alabama, Tennessee, and Ohio rivers. It is of further interest that *C. spicatus* appears to be confined to Little River in Fairfield and Richland counties, South Carolina. While an intensive survey of the Broad River, into which the Little River flows, has not been conducted, several collections are available from each of the counties along its course and all of them contain other species which appear to be vicariants of *C. spicatus*.

I wish to thank Dr. E. C. Raney, Mr. E. A. Crawford, and Mr. T. R. Bello for their assistance in securing the specimens on which this description is based.

***Cambarus spicatus*¹, sp. nov.**

Diagnosis.—Rostrum excavate above without thickened margins; margins converge to marginal spines or tubercles which clearly mark the base of the subspiculiform acumen. Areola 3.3-5.0 times longer than broad with five to nine shallow punctations across narrowest part, and constituting 30.3-34.6 per cent of entire length of carapace. A well developed spine present on each side of carapace immediately caudad of cervical groove. Cephalolateral portion of carapace with one or more spines anterior to cervical groove. Suborbital angle with a spine or small tubercle. Postorbital ridges well developed and terminate cephalad in a spine or acute tubercle. Chela broad, depressed, with costate outer margin; a distinct depression above and below base of immovable finger; inner margin of palm with two distinct rows of tubercles; fingers of adults long and gaping. (For pleopods and annulus ventralis, see figures 1, 2, 3, 5, and 10.)

Holotype Male, Form I.—Body subovate, somewhat depressed. Abdomen narrower than thorax (17.7 and 20.4 mm. in widest parts respectively). Width of carapace greater than depth in region of caudodorsal margin of cervical groove (19.6 and 16.0 mm.). Greatest width of carapace (20.4 mm.) a short distance caudal to cervical groove. Areola broad (4.6 times longer than wide), with seven small shallow punctations in narrowest portion. Cephalic portion of carapace 1.9 times as long as areola (length of areola 34 per cent of entire length of carapace). Rostrum excavate above; margins convergent and not thickened; long acumen, distinctly set off at base by corneous, acute marginal tubercles, and with an upturned, corneous, spine-like tip. Upper surface of rostrum with the usual submarginal row of setiferous punctations and these rows continue cephalad onto the acumen where the setae form a pubescent coat on the upper surface; suborbital ridges poorly developed and evident in dorsal aspect for only a short distance at base.

Postorbital ridges, moderately well defined and deeply grooved dorsolaterally, terminate cephalically in acute corneous tubercles. Suborbital angle terminates in an acute corneous tubercle. Branchiostegal spine well defined and acute. Lateral surface of carapace strongly granulate and with a prominent spine immediately caudad of cervical groove above which is a single subacute tubercle somewhat larger than neighboring granules; lateral surface anterior to cervical groove with about seven spiniform tubercles, two of which are more conspicuous than others;

¹*Spicatus*—(*spicus*) L.,—point; so named because of the spines on the cephalolateral portion of the carapace, a unique characteristic of epigeic species of this genus.

upper surface of carapace mostly punctate with a small polished area in gastric region. Abdomen shorter than carapace (36.8 and 38.8 mm.). Cephalic section of telson with two spines in each caudolateral corner.

Epistome (fig. 7) subtriangular with shallow emarginations cephalolaterally; margins not swollen but somewhat elevated (ventrally). Antennules of the usual form with a spine present on lower surface of basal segment. Antennae extend caudad to base of telson. Antennal scale (fig. 4) broadest slightly distad of midlength; outer thickened portion not so broad as lamellar portion and bearing a prominent spine distally.

Left chela depressed with palm slightly inflated; punctate except for upper mesial portion of palm and certain areas of fingers (see below). Outer margin of hand costate. Inner margin of palm with a row of eight tubercles and an additional one slightly below this row at base of distal third; a well defined row immediately above the aforementioned row consisting of seven tubercles. A prominent tubercle on lower surface of palm at base of dactyl. Fingers distinctly gaping. Upper and lower surfaces of dactyl and upper surface of immovable finger with a submedian ridge flanked on both sides by deep punctations. Opposable margin of immovable finger with a row of 12 knob-line tubercles extending from base to distal sixth of finger; the fourth from base conspicuously larger than others; two tubercles occurring just below this row at base of distal fourth of finger; a row of minute denticles present along distal fourth of finger; a number of conspicuous plumose setae at base of finger. Lateral surface of immovable finger costate with a row of squamous tubercles proximally and a row of setiferous punctations distally. Lower surface of immovable finger punctate. Opposable margin of dactyl with a row of 18 knob-like tubercles, the first and fifth from base larger; a row of minute denticles on distal sixth of finger. Mesial surface of dactyl with a number of tubercles on basal third; with a single row on middle third, and a row of setiferous punctations along distal third. (Distal two podomeres of right cheliped abnormal.)

Carpus of cheliped longer than broad and with a well defined longitudinal furrow above; sparsely punctate except laterally. Mesial surface with a single procurved spike-like tubercle (an additional smaller tubercle proximal to it on right cheliped); lower surface with two tubercles on distal margin (right cheliped with an additional one proximomesiad of the more mesial one on lower distal margin).

Merus of cheliped sparsely punctate except on upper distal portion; upper surface mostly rough with two spiniform tubercles somewhat proximad of distal margin; lower surface with a mesial row of nine, mostly spiniform, tubercles and a lateral row of four, only two well-developed (right cheliped with ten and five in the respective two rows).

Hooks on ischiopodites of third pereopods only (fig. 8); hooks strong and simple and tips extend proximad of distal margin of basipodite. Coxopodite of fourth pereopod with a knob-like prominence on caudal mesioventral angle.

First pleopod (figs. 1 and 5) symmetrical and reaching caudal margin of coxopodite of third pereopod when abdomen is flexed; distal portion terminating in two distinct parts. Central projection corneous, blade-like and extending caudal at approximately 90 degrees to the main longi-

tudinal axis of the appendage; tip slightly cleft. Mesial process non-corneous, bulbiform and tapering to blunt tip directed caudolateral at an angle similar to that assumed by central projection.

Morphotypic Male, Form II.—Differs from the holotype in the following respects: Subrostral ridges more strongly developed and evident to base of acumen; subacute tubercle above spine on lateral surface of carapace much reduced; opposable margins of both fingers of cheliped with plumose setae that obscure the tubercles; lower mesial row of tubercles on merus consisting of six and lateral of three. Hooks on ischiopodites of third pereopods not reaching proximad to distal end of basipodites. First pleopod (figs. 2 and 3) similar to that of holotype; however, central projection not corneous and much heavier; basipidoischial groove clearly evident in both mesial and lateral aspects. (See measurements.)

Allotypic Female.—Differs from the holotype in the following respects: Subrostral ridges better developed than in holotype but not evident to base of acumen as in morphotype; subacute tubercle above spine on lateral surface of carapace not so strongly developed as in holotype; opposable margin of immovable finger with 10 tubercles; opposable margin of dactyl with 12; lower mesial row of tubercles on merus consisting of eight and nine on right and left chelipeds respectively, and lateral row of three and four. Other differences involve only secondary sexual characteristics and measurements (see below). *Annulus ventralis* (fig. 10) subtrapezoidal in outline. Caudal wall high, laterally forming oblique ridges; cephalic half with a median sinus and a low elevation paralleling it one each side; near midlength of annulus the sinus makes a dextral hairpin turn and at the median line turns caudad to the midcaudal margin of annulus; fossa occurs at the hairpin turn.

Measurements (in millimeters).—

		Holotype	Allotype	Morphotype
Carapace	Height	16.0	16.1	12.0
	Width	20.4	19.1	14.7
	Length	38.8	38.2	29.9
Areola	Width	2.9	2.8	2.5
	Length	13.2	12.6	9.9
Rostrum	Width	5.2	5.3	4.4
	Length	10.4	10.2	8.3
Chela (Left)	Length of inner margin			
	of palm	10.7	7.5	4.9
	Width of palm	15.6	10.4	6.3
	Length of outer margin			
	of hand	36.2	26.0	18.0
	Length of dactyl	22.8	15.6	11.4

Type Locality.—Little River, 10.3 miles west of Winnsboro, Fairfield County, South Carolina on St. Rte. 22. Here the river, some 25 to 30 feet broad, flows with a moderate current over a sand and clay bottom. The river bed is apparently devoid of any attached aquatic vegetation. In the vicinity are *Liriodendron tulipifera*, *Liquidambar styraciflua*, *Ilex* sp., *Ulmus* sp., *Quercus* sp., and *Pinus* sp. On April 18, 1955 the water was somewhat turbid and had a temperature of 20°C. All of the specimens of *C. spicatus* were collected from debris along the margins of the stream.

Disposition of Types.—The holotypic male, form I, allotypic female,

and morphotypic male, form II are deposited in the United States National Museum (Nos. 99323, 99324 and 99325 respectively). Of the paratypes, one second form male and one female are deposited in the collection of Dr. George H. Penn at Tulane University; 13 males, form II, 11 females, five juvenile males, and six juvenile females are in my personal collection at the University of Virginia.

Specimens Examined.—This species is known from only two localities on Little River in Fairfield and Richland counties, South Carolina. *Fairfield Co.*—The type locality, 3-2851-4 (1♂ I, 4♀♀), E. C. Raney, coll.; 4-1855-6c (6♂♂ II, 8♀♀, 1 juv. ♂, 4 juv. ♀♀), E. A. Crawford, T. R. Bello, and H. H. H., coll. *Richland Co.*—2.2 mi. WNW jct. of S. C. Rts. 215 and 269, near Richtex. 9-0055-1a (4♂♂ II, 3 juv. ♂♂, 2 juv. ♀♀), E. A. C., coll.; 10-3054-1 (5♂♂ II, 1 ♀, 1 juv. ♂), E. A. C., coll.

Color Notes.—*Cambarus spicatus* is one of the more spectacularly colored species of the genus. The background is for the most part a pinkish-tan. The postorbital ridges are conspicuously marked with purplish-brown as is a large symmetrical pair of splotches in the gastric region of the carapace. The lateral portion of the carapace is a grayish-green with a conspicuous pink band extending from just above the suborbital angle ventrally to just below the cephalic extremity of the cervical groove where it turns caudally to follow the groove to the level of the lateral spine on the carapace. Below this pink band on the branchiostegite is a purplish-brown area, the caudal margin of which is marked by a tongue-like cream wedge extending caudodorsally from the ventral margin of the branchiostegite just below the lateral spine of the carapace. The abdomen is also pinkish-tan with bright pink and greenish-brown markings. The cephalic half of the epimera are greenish-brown and the caudal half and margins are pink. The chelae are olive green with pale pink tubercles; the lower tips of the fingers and the lateral margin of the immovable finger are orange in color, and the upper surfaces of the tips of the fingers are scarlet. All of the tubercles are pink or white both on the carapace and chelipeds.

Relationships.—*Cambarus spicatus* probably has its closest affinities with *Cambarus extraneus*. There are certain characteristics which suggest a relationship with the members of the *Montanus* group, and it is conceivable that it occupies a somewhat transitional position between the *montanus* and *extraneus* complexes. It may readily be distinguished from all other epigeal members of the genus by the combination of marginal spines on the rostrum and the group of spines on the sides of the carapace anterior to the cervical groove.

Variations.—The most conspicuous variations in *Cambarus spicatus* are found in the rostrum. Although marginal spines are always present, the margins may be subparallel, slightly converging, or even slightly biconvex. The acumen may be relatively short with a blunt, slightly upturned apex, or it may be long and spiculiform. As indicated in the diagnosis, the areola ranges from 3.3-5.0 times as long as broad and constitutes from 30.3-34.6 per cent of the entire length of the carapace. The number of punctations across the narrowest part of the areola varies from five to nine.

Cambarus rusticiformis Rhoades

This species has been reported previously from tributaries of the Cumberland River in Logan and Trigg Counties, Kentucky (Rhoades, 1944:133). The following three new records extends the known range to the southeast. *Cumberland Drainage*: Little Crab Creek about seven miles west of Jamestown, Fentress County, Tennessee, April 29, 1945 (7♂♂ II, 3♀♀, 2 juvenile ♂♂, 1♀ with eggs), C. S. Shoup and H. H. H., coll.; Poplar Cove Creek, about five miles west of Jamestown, Fentress County, Tennessee, September 21, 1945 (1♀), C. S. S., coll. and on October 10, 1948 (1♂ I, 4♀♀), C. S. S., coll.; Rocky River, a tributary of Caney Fork, Van Buren County, Tennessee, August 3, 1951 (1♀), John W. Parsons, Coll.

Key to the Species of the Extraneus Section of the Genus *Cambarus*

- 1 Antennal flagellum strongly compressed and bearded on inner margin . . . Green River, Edmonson Co., Kentucky *Cambarus cornutus* Faxon
- 1' Antennal flagellum normal 2
- 2 (1') One to several spines on lateral portion of carapace anterior to cervical groove . . . Little River, Fairfield and Richland Counties, South Carolina *Cambarus spicatus*, sp. nov.
- 2' No spines on lateral portion of carapace anterior to cervical groove 3
- 3 (2') Inner margin of palm of chela with two serrate rows of tubercles; the inner consisting of seven or less in number; lateral spines on rostrum never strongly developed . . . Alabama River system in N.W. Georgia and N.E. Alabama *Cambarus jordani* Faxon
- 3' Inner margin of palm of chela with two rows of tubercles; neither row serrate and inner row usually consisting of eight or more; lateral spines on rostrum usually well developed 4
- 4 (3') Rostrum less than one-fourth total length of carapace . . . Cumberland River system from Fentress Co., Tenn. to Trigg Co., Kentucky *Cambarus rusticiformis* Rhoades
- 4' Rostrum more than one-fourth total length of carapace . . . Alabama and Tennessee drainage systems in Georgia, Alabama, Tennessee, and Kentucky *Cambarus extraneus* Hagen

LITERATURE CITED

- Faxon, Walter. 1884. Descriptions of new species of *Cambarus*; to which is added a synonymical list of the known species of *Cambarus* and *Astacus*. *Proc. Amer. Acad. Arts and Sci.*, 20:107-158.
- Hagen, Herman A. 1870. Monograph of the North American Astacidae. Ill. *Cat. Mus. Comp. Zool.*, Harvard College, (3):1-109, pls. 1-11.
- Ortmann, Arnold E. 1931. Crawfishes of the Southern Appalachians and the Cumberland Plateau. *Ann. Carnegie Mus.*, 20(2):61-160.
- Rhoades, Rendell. 1944. The crayfishes of Kentucky, with notes on variation, distribution and descriptions of new species and subspecies. *Amer. Midl. Nat.*, 31(1):111-149, 10 figs., 10 maps.

Explanation of Plate

Cambarus spicatus

Fig. 1. Mesial view of first pleopod of male, form I.

Fig. 2. Mesial view of first pleopod of male, form II.

Fig. 3. Lateral view of first pleopod of male, form II.

Fig. 4. Antennal scale of male, form I.

Fig. 5. Lateral view of first pleopod of male, form I.

Fig. 6. Lateral view of carapace of male, form I.

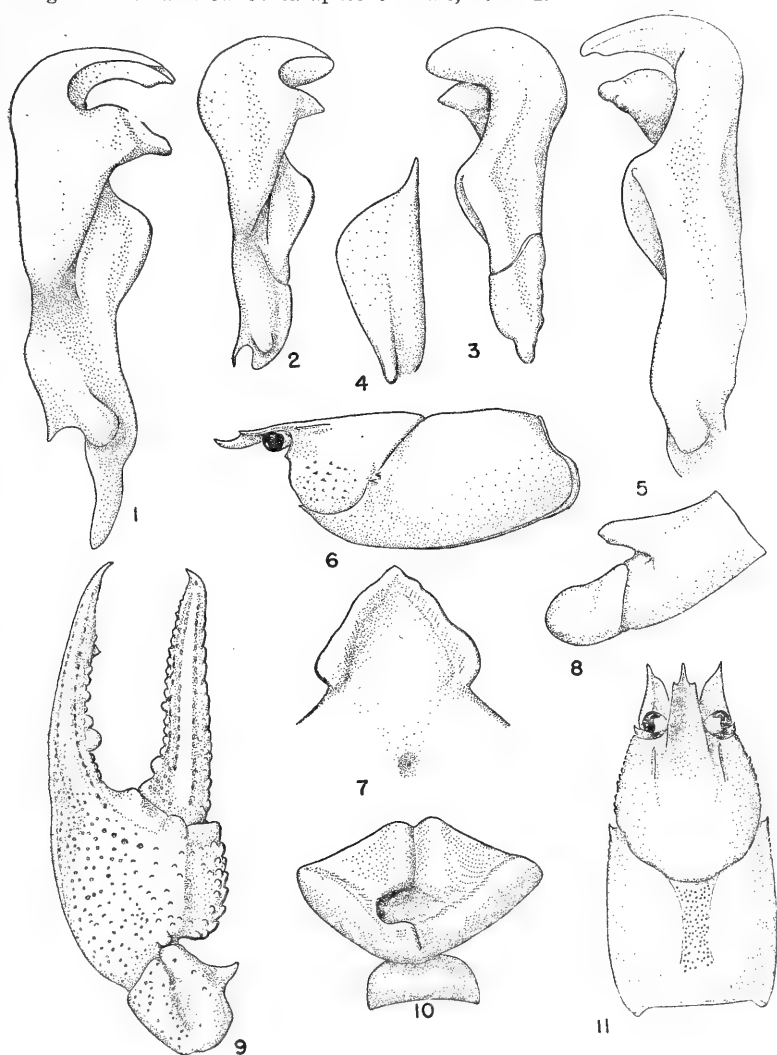
Fig. 7. Epistome of male, form I.

Fig. 8. Basipodite and ischiopodite of third pereopod of male, form I.

Fig. 9. Distal podomeres of cheliped of male, form I.

Fig. 10. Annulus ventralis.

Fig. 11. Dorsal view of carapace of male, form I.





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PROCEEDINGS
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ADDITIONAL FORMS OF BIRDS FROM PANAMÁ AND
COLOMBIA

BY ALEXANDER WETMORE

The two races described herewith have been determined during recent studies of the collections in the United States National Museum.

Columbidae

Zenaidura macroura turturilla subsp. nov.

Characters.—Generally similar in pale color to *Zenaidura macroura marginella* (Woodhouse)¹ but smaller; usually more buff on lower abdomen and under tail coverts; female somewhat darker, especially on the under surface.

Description.—U. S. Nat. Mus. no. 433,585, male adult (testes enlarged), El Espino, Provincia de Panamá, Panamá, collected April 1, 1951, by A. Wetmore and W. M. Perrygo (orig. no. 16,653). Forehead pinkish buff, shading to warm avellaneous on pileum and sides of crown; center of posterior part of crown and upper hindneck deep quaker drab; lower hindneck and adjacent upper back mouse gray; sides of neck warm light drab, with an elongated area extending down to the shoulder glossed with metallic purple, becoming metallic bronze-green in anterior portion, and showing a reflection of metallic bronze-green throughout; back, scapulars, tertials, inner secondaries and lesser wing coverts drab; rump and upper tail coverts light drab; a few flecks of black on the inner lesser wing coverts, increasing in extent on the scapulars, forming prominent spots and edgings of black on the tertials; middle and greater wing coverts mouse gray, washed on outer webs with drab and light drab; primaries chaetura black, the outer webs with a grayish wash, edged narrowly with white; secondaries neutral gray with a wash of drab at tips and on outer webs; central rectrices chaetura drab; next outer pair neutral gray, with an angular central spot of black, the outer margins of the webs washed with hair brown; the remaining rectrices with the basal area neutral gray, followed by a broad band of black and a broader tip of white; the under surface of all except the central pair extensively black at the base; sides of head pinkish buff below and behind the eye; a, small, narrow, elongated spot of black, glossed with blue, behind and below auricular region; chin and throat tilleul buff;

¹*Ectopistes marginella* Woodhouse, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, August 20, 1852, p. 104 (Cross Timbers, north fork of Canadian River, Oklahoma).

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foreneck and upper breast light cinnamon-drab, becoming cinnamon-drab on the sides of the neck; lower breast avellaneous; abdomen light cinnamon-buff; under tail coverts pinkish buff; sides and flanks light neutral gray; under wing coverts dark neutral gray; axillars light fuscous. Bill black; tarsus and toes dull buffy brown; claws fuscous. (From dried skin).

Measurements.—Males (6 specimens), wing 135.2-139.9 (137.3), tail 125.4-144.9 (132.2, average of three), culmen from cere 7.8-8.5 (8.0), tarsus 20.3-22.3 (21.2) mm.

Females (2 specimens) wing 124.7-129.7 (127.7), tail 107.3-111.2 (109.2), culmen from cere 7.6-8.2 (7.9), tarsus 18.9-20.2 (19.5) mm.

Type, male, wing 136.1, (tail with tip badly worn), culmen from cere 7.8, tarsus 21.2 mm.

Range.—Tropical savannas of western Panamá from western Chiriquí (base of Volcán de Chiriquí), through Veraguas (Soná, San Francisco, Calobre, Santiago) and Coclé (Penonomé, Antón) to western Provincia de Panamá (El Espino, base of Cerro Chame).

Remarks.—For many years status of the mourning dove in Panamá has been uncertain due to the small amount of information available. The western subspecies, *Zenaidura macroura marginella*, has been reported in winter from the western area of the republic, where I have seen birds occasionally that I believe were this race, though I was not able to secure specimens. Griscom recorded one bird of the eastern form *Z. m. carolinensis* from Divalá in western Chiriquí, and also listed the typical form *Z. m. macroura* as breeding near Santiago, Veraguas, in 1925.²

In March and early April, 1951 I saw mourning doves occasionally in the lowlands of the extreme western part of the Provincia de Panamá near El Espino, and on April 1 secured a male that was definitely a resident bird as it had been noted for a week at one particular spot along the highway. Further the testes were about one-half enlarged, which would not have been the case with a migrant.

Here the matter rested until May 10, 1953 when I found a dozen in a burned savanna 3 miles northwest of Antón, Coclé, noted males in display flight, and finally was able to approach a pair feeding together and shot the female. In this same area on May 13 I saw a number of scattered birds, and two flocks of about 25 each. In Veraguas, near Soná and Santiago, we found occasional mourning doves from May 20 to June 9, and secured two more males, one taken May 20 being in partial body molt. Others were noted near Penonomé, Coclé, June 17, and in the original locality near Antón on June 20. On March 26 and 27, 1955 I was interested to find a few of these doves around the base of Cerro Chame to the west of Bejuco, where they were cooing and were evidently resident. This point, about 50 kilometers from Balboa and Panamá City, is the farthest east at which I have observed the species to date.

With 3 males and 1 female taken personally in hand it was obvious that these represented a distinct race, similar in color to *Z. m. marginella* but smaller. Also it appeared that this Panamanian form, while similar in size to *Z. m. macroura* of Cuba with which it had been listed, was

²Bull. Mus. Comp. Zool., vol. 78, April, 1935, p. 310.

definitely paler. During study at the British Museum (Natural History) in the summer of 1954 I found 3 more of these small birds in the Salvin-Goldman collection from Chiriquí, and from Calobre, on the Pacific side of Veraguas. There is also one in the U. S. National Museum, taken by Rex Benson, March 12, 1931, at San Francisco, Veraguas, 25 kilometers west of Calobre. Through this material it has been possible to make definitive studies, and to determine that the resident bird of Panamá represents an unrecognized form. Its smaller size is evident when the measurements given above are compared with the following set for *Z. m. marginella* taken from Ridgway³: Males (29 specimens), wing 142-156.5 (149.4), tail 121-158 (138.4) mm. Females (10 specimens), wing 132.5-152 (143.2), tail 117-158 (127.3) mm.

The main difference is evident in the wing, since measurements of the tail are unreliable due to wear, particularly in the Panamanian series where the birds usually are resident in a harsh environment with rough, stony soil.

It is interesting that in the mourning dove as a species, where there are two color groupings, an eastern one that is darker and a western one that is paler, we may observe now that in both the northern birds are large and the more southern ones are small. The race *turturilla*, here described, thus has the same size relation relative to the northern *marginella* that the small *macroura* of Cuba bears to the northern *carolinensis*.

From present information the western mourning dove, *Z. m. marginella* is known to nest as far south as southern México. Mourning doves were recorded breeding near Dueñas, Guatemala by Osbert Salvin many years ago, and the species also has been found throughout the year in Costa Rica, though no evidence as to nesting has come to attention. Carriker was under the impression that those seen during the months of the northern summer were merely migrants that from age or infirmity had not made the return flight north, and that were incapable of breeding. Available information indicates a considerable separation in distance for the resident mourning doves of western Panamá from other breeding groups.

Trochilidae

Phaethornis augusti curiosus subsp. nov.

Characters.—Similar to *Phaethornis augusti augusti* (Bourcier)⁴ but definitely paler; throat and under tail coverts nearly white; above gray, less greenish.

Description.—Type, U. S. Nat. Mus. no. 383,539, female, Atanquez, elevation 2500 feet, Magdalena, Colombia, collected May 30, 1945, by M. A. Carriker, Jr., (orig. no. 6120). Pileum chaetura drab faintly glossed with bronze-green; the feathers margined lightly with hair brown (producing faint squamations); hindneck, back and scapulars grayish bronze-green; rump and upper tail coverts Mikado brown; wing coverts bronze green (darker than the back); remiges slightly darker than chaetura drab, with a faint greenish gloss, the outer one

³U. S. Nat. Mus. Bull. 50, pt. 7, 1916, p. 348.

⁴*Trochilus augusti* Bourcier, Ann. Sci. Phys. Nat. Agric. et Ind., Soc. roy., etc., Lyon, vol. 10, 1847, p. 623 (Caracas, Venezuela).

marginated lightly on the outer web with pale olive-buff; rectrices basally bronze green, tipped broadly with white, the lateral pairs becoming blackish at the junction with the white of the tip; side of the head including lores dull black, with a broad stripe of white extending above the eye and the ear coverts, and another from the rictus to the posterior margin of the ear coverts; chin and center of throat white; sides of throat, foreneck and breast pale grayish white, becoming white on the abdomen; sides and flanks tinged slightly with pale pinkish buff; under tail coverts white; edge of wing dull white; under wing coverts chaetura black; axillars white. Maxilla and tip of mandible black; rest of mandible dull cream color; tarsus and toes fuscous; underside of toes dull-cream-buff; claws dull black. (From dried skin.)

Measurements.—Females (4 specimens), wing 56.8-59.0 (58.2), tail 75.0-84.4 (78.4, average of three), culmen from base 31.7-35.0 (33.1) mm.

Type, female, wing 59.0, tail 84.4, culmen from base 33.8 mm.

Range.—Known only from the type locality, near Atanquez on the east base of the Sierra Nevada de Santa Marta, Magdalena, Colombia.

Remarks.—This hermit hummingbird has been known in Colombia previously only from the upper tropical zone of the eastern Andes where the most northern record is at Ocaña, Norte de Santander. The specimens from Atanquez thus mark a considerable extension of range and record the species for the first time in the area of the Sierra Nevada de Santa Marta. As the species is one of the higher levels in the tropical zone this northern population is isolated by the break between the Sierra Negra and the Sierra Nevada. The four specimens stand out at a glance from our series of *P. a. augusti* in much whiter under surface, the distinction being of especial interest in view of the wide range of the typical form from the mountains of eastern Colombia, through the Mérida region and the coast range of northern Venezuela. There are no males in our series of four specimens but the species is one in which the sexes are alike.



PROCEEDINGS
OF THE
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**THREE NEW BIRDS FROM CERRO EL TETEO, VENEZUELA,
AND EXTENSIONS OF RANGES TO VENEZUELA AND
COLOMBIA**

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

The situation of Cerro El Teteo, in the extreme southwestern part of the State of Táchira, in the Orinoco watershed, is described in our "Five New Venezuelan Birds and Nine Extensions of Ranges to Colombia."¹

The ranges of ten species or subspecies are here extended to Venezuela and that of one subspecies to Colombia.

We thank Dr. John T. Zimmer, Chairman of the Department of Birds of the American Museum of Natural History, for access to that collection.

Specimens are in the Phelps Collection, Caracas, unless otherwise specified. Names of colors are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature," 1912. Wing measurements are of the chord.

Penelope argyrotis mesaeus Conover

Penelope argyrotis mesaeus Conover, Proc. Biol. Soc. Wash., 58, p. 125, 1945. (Pamplona, Norte de Santander, Colombia.)

1 ♂, 1 ♀, Cerro El Teteo, Burgua, Táchira; 1250 and 1300 meters.

These specimens constitute an extension of range to Venezuela from southeastern Colombia where the subspecies is known only from the type locality and from "Bogotá" (de Schauensee, Birds of Colombia, p. 418, 1949). Cerro El Teteo is less than 50 miles, due east, from Pamplona, on the southern approaches to the Páramo de Tamá.

Nyctibius griseus panamensis Ridgway

Nyctibius griseus panamensis Ridgway, Proc. Biol. Soc. Wash., 25, p. 91, 1912. (Ná, Coclé, Panamá.)

1 ♂ juv., 1 ♀, Burgua, Táchira (southwestern), 350 meters; 1 ♂, Río Chiquito, Hda. La Providencia, Táchira (southwestern), 1800 meters.

These specimens constitute an extension of range of the subspecies to Venezuela from northern Colombia.

Measurements of the adults: 1 ♂—wing, 281 mm.; tail, 195; 1 ♀—wing, 276; tail, 198.

The following measurements of specimens from north of the Andes along the Colombian frontier in Ureña, northwestern Táchira, and the Perijá Mountains, Zulía, correspond decidedly to those of the smaller race, *N. g. griseus* (Gmelin) of southern Venezuela: 3 ♂—wing, 242-260 (252); tail, 164-184 (174); 2 ♀—wing, 248-256 (252); tail, 170-176 (173).

Lurocalis semitorquatus nattereri (Temminck)

Caprimulgus nattereri Temminck, Pl. col., livr. 18, pl. 107, 1822.

¹Proc. Biol. Soc. Wash., 68, p. 47, May 20, 1955.

(Brazil; Ypanema, Sao Paulo, Brazil, designated as type locality by Hellmayr, Nov. Zool., 17, p. 379, 1910).

4 ♂, 1 (♀), in the collection of the Estación Biológica de Rancho Grande, Parque Nacional Henri Pittier, Aragua.

These specimens extend the range of the subspecies to Venezuela from southern Brazil.

Dr. Ernst Schäfer, Director of the Biological Station at Rancho Grande, noticed that five specimens of *L. semitorquatus* were notably heavier than his series of 29 *L. s. schaeferi* Phelps and Phelps, Jr. In 1954 he sent these 34 specimens to Dr. Ernst Mayr at the Museum of Comparative Zoology at Cambridge. Dr. Mayr reported to him that the large specimens might be migrant *nattereri*, as he found a consistent difference in color in addition to the notable non-overlapping measurements of wings and tail, and also in weights which Schäfer had indicated on all the labels.

Dr. Mayr suggested to Schäfer that the specimens be turned over to us for further study, which was carried out at the American Museum of Natural History.

L. s. schaeferi is a common resident at Rancho Grande throughout the year at altitudes from 400 to 1000 meters. The five *nattereri* were all collected during July and August, and all at 1000 meters on the flyway over the highway pass at Portachuelo. (see Las Aves del Parque Nacional "Henri Pittier" (Rancho Grande) y sus Funciones Ecológicas. Ernst Schäfer y William H. Phelps. Bol. Soc. Ven. Cien. Nat., 16, No. 83, p. 65, 1954.)

Comparative measurements (Dr. Mayr's, the wing flat):

schaeferi. 9 adult males—wing, 181-192 (187) mm.; tail, 78-85 (80.7); weight, in grams, 63-84 (74).

nattereri. 4 adult males—wing, 206-217 (211.5); tail, 89-100 (94.2); weight, 110.5-118.3 (113.2); one specimen of undetermined sex—wing, 214; tail, ____; weight, 109.2.

In New York, the specimens were compared with 7 *nattereri* from Brazil, all from south of the Amazon. Besides the larger size and greater weight of *nattereri* the following differences in color were noted, which confirm Dr. Mayr's notes: the speckling on breast is buffier, less whitish; and the abdomen is more rufous because of fewer and narrower black bars. Dr. Mayr also noted other color differences. As far as we know, *nattereri* has not been previously recorded as a migrant north of the Amazon.

Thalurania furcata rostrifera, new subspecies

Type: From Cerro El Teteo, Burgua, Estado Táchira, Venezuela; 850 meters. No. 60640, Phelps Collection, Caracas. Adult male collected July 27, 1954, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Similar to *T. f. colombica* (Bourcier) but bill longer in both sexes. Bill is also longer than that of the other purple crowned races, *T. f. townsendi* Ridgway and *T. f. venusta* (Gould), of Central America.

Range: Known from Burgua and the nearby Cerro El Teteo, in the forests of the southwestern corner of the State of Táchira, in the Tropical and lower Subtropical Zones at altitudes from 350 to 1250 meters.

Description of Type: Forehead and lores uniformly Violet Ultra-

marine; rest of head, nape and upper tail-coverts Rinnemann's Green; scapular region Lyons Blue; rump with a more bronzy tinge. Chin, throat and forebreast lustrous, glittering Emerald Green X Cendre Green; forebreast, sides, flanks and abdomen Lyons Blue. Wing Dark Slate Violet; median upper wing-coverts greenish, the lesser ones bluish; under wing-coverts bluish green. Tail Dusky Blue.

Bill (in life) "black"; feet "black"; iris "dark." Wing, 53 mm.; tail, 40; exposed culmen, 21; culmen from base, 25; tarsus 4.

Remarks: Sexes unlike in color, the males with longer wings and tail. Size similar to *colombica* except bill longer. Range of measurements: nine adult males, including type—wing, 51-55 (52.8) mm.; tail, 36-42 (39.1); exposed culmen (8), 20-22 (20.9); five adult females—wing, 47-51 (48.8); tail, 29-32 (30.4); exposed culmen, 21-22 (21.6). Measurements of *colombica* (from San Agustín and La Candela, Huila)—wing, 50-55 (52.7); tail (9), 36-41 (38.4); exposed culmen, 16-17.5 (17.1); five adult females—wing, 49-52 (50); tail, 28-32 (29.4); exposed culmen, 17-18.5 (18).

Description of female. They are greenish above, more bronzy on crown; underparts grayish; remiges as in male; tail is square instead of forked as in male, the rectrices blue with greenish luster basally and the four outermost ones broadly tipped with white.

Description of juvenal male. One specimen, No. 60545. Forehead green, similar to rest of head and back, instead of the violet blue of the adult; the blue on upper parts is less extensive and greener; and the blue of posterior under parts is limited to spots on a dusky ground and these are Benzol Green instead of Lyons Blue as in the adult.

Two specimens of *colombica*, also from Táchira, are from the northern slopes of the Andes, in the Lake Maracaibo watershed.

Specimens Examined

T. f. townsendi.³—NICARAGUA: 20.²

T. f. venusta.³—COSTA RICA: 34.² PANAMA: 37.²

T. f. colombica.—COLOMBIA:³ San Agustín, Huila, 10 ♂, 2 ♀; Andalucía, 1 ♂, 1 ♀; La Candela, 4 ♂, 3 ♀; El Consuelo, 1 ♂; "Bogotá," 20 [♂], 6 [♀]; Santa Marta region, 22 ♂, 22 ♀. VENEZUELA: La Sabana, Perijá, 2 [♂]; Cerro Pejochaina, 2 ♂, 1 [♀]; Kunana, 1 [♀]; Barranquilla, 1 ♂, 2 [♀]; Cerro Mashirampé, 1 ♂; Seboruco, Táchira, 2 ♂; La Azulita, Méida, 1 ♂³; Cerro El Cerrón, Lara, 3 ♂, 1 ♀; Quebrada Arriba, 1 ♂; Altmira, Barinas, 2 ♂.

T. f. rostrifera.—VENEZUELA: Cerro El Teteo, Táchira, 7 ♂, 4 ♀, 5 [♀], 1 ♂ juv.; Burgua, 3 ♂ (inc. type), 2 ♀, 1 [♀].

Sittasomus griseicapillus tachirensis, new subspecies

Type: From Cerro El Teteo, Burgua, Estado Táchira, Venezuela; 700 meters. No. 60603, Phelps Collection, Caracas. Adult (female) collected July 23, 1954, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Nearest to *S. g. griseus* Jardine, of the north coast of Venezuela and Tobago, from which it differs by more olivaceous, less yellowish, upper and lower parts and darker, more reddish, less orange, rump and upper tail-coverts.

²For localities see Zimmer, Bds. Perú, Am. Mus. Nov., No. 1474, p. 19, Nov. 10, 1950.

³Specimens in American Museum of Natural History.

Range: Known from the extreme southwestern part of the State of Táchira in forests of the Tropical Zone at altitudes between 300 and 800 meters.

Description of type: Top of head and back Dark Citrine; rump and upper tail-coverts Amber Brown. Under parts Buffy Olive; under tail coverts Sudan Brown. Wings Fuscous; outer vanes of remiges irregularly margined with rusty; tertails broadly tipped with Hazel, the inner ones entirely Hazel; inner webs of remiges, except the more outer ones, traversed in the middle by a broad Light Buff band; lesser upper wing-coverts margined with olivaceous; under wing-coverts and axillaries Light Buff. Tail Amber Brown, paler on under surface; shafts of rectrices Mars Orange.

Bill (in life) "black, base gray;" feet, "gray;" iris "dark." Wing, 68 mm.; tail, 62; exposed culmen, 14; culmen from base, 17; tarsus, 16.

Remarks: Sexes alike in color but males with longer wings and tail. Size similar to *griseus*. Range of measurements: four adult males—wing, 77 - 82 (79) mm.; tail, 73 - 81 (76); culmen from base 17 - 17 (17); two adult [females], including type—wing, 68 - 70 (69); tail, 62 - 67 (64.5); culmen from base, 16 - 17 (16.5). Measurements of *griseus*, from the northeastern coast of Venezuela: five adult males—wing, 83 - 85 (83.8); tail, 78 - 85 (81.6); culmen from base, 17 - 19 (18.2); four adult females—wing, 69 - 74 (71.7); tail, 68 - 75 (71); culmen from base, 17 - 18 (17.2).

Three immature specimens are dusky olive both above and below. A male has not been used as the type as they have some of the primaries in moult. The males of this species are larger than the females; we presume that the type is a female because of its smaller size.

Specimens Examined

*S. g. sylvioides*².—MEXICO: 5. NIGARAGUA: 2. HONDURAS: 5. COSTA RICA: 18.

S. g. levis.—PANAMÁ: 18³.

S. g. perijanus.—VENEZUELA: Zulia: La Sabana, Perijá, 2 ♂, 2 ♀, 2 (?); Cerro Yin-Taina, 3 ♂, 1 ♂, 1 (?); Cerro Pejochaina, 3 ♂, 2 ♀; Cerro Mashirampé, 2 ♂, 1 (?).

S. g. tachirensis.—VENEZUELA: Táchira: Cerro El Teteo, Burgua, 1 [♀] (type), 1 (?) juv.; Burgua, 3 ♂, 1 [♀], 1 ♀ juv., 1 imm.; Santo Domingo, 1 ♂.

S. g. griseus.—VENEZUELA: 23⁴; Lara: Cerro El Cerrón, 3 ♂; Cerro El Cogollal, 1 ♂, 1 ♂ juv., 2 ♀; Cubiro, 1 ♀, (?). Carabobo: Urama, 1 ♀; Colonia Chirgua, 2 ♀; Hda. Santa Clara, 1 (?). Distrito Federal: San José de Los Caracas, 1 ♂, 1 ♀. Miranda: Cerro Golfo Triste, 3 ♂, 2 ♀; Cerro Negro, 2 ♂, 1 (?); Tacarigua, 1 ♀. Anzoátegui: Quebrada Bonita, 5 ♂, 4 ♀, 1 (?). Sucre: Los Altos, 1 ♂. Monagas: Caripe, 4 ♂, 1 ♂ juv., 1 ♀, 2 (?). TOBAGO: 2 ♂, 1 [♂].

S. g. amazonas.—VENEZUELA: 4⁵. Terr. Amazonas: Yavita Pimichín portage, 1 ♂, 2 ♀; San Fernando de Atabapo, 1 ♀. COLOMBIA: 1⁵. ECUADOR: 7⁵. PERU: 16⁵. BRAZIL: 35⁵.

S. g. axillaris.—VENEZUELA: 6⁵. Terr. Amazonas: Cerro Paraque, 1 ♂, 3 ♀; Cerro Yaví, 1 (?); Cerro Camani, 1 ♂; Cerro Parú, 1 ♀. Bolívar: Cerro El Negro, 1 ♀; Puerto Carretico, Río Mato, 2 ♂, 1 ♀;

Cerro Sarisariñama, 1 ♀; La Paragua, 1 ♀; Cerro Tigre, 2 ♀, 2 (♂); Cerro Guaiquinima, 2 ♂, 1 ♀; Salto Maiza, 1 (♂); Santa Elena, 1 ♂, 1 ♀; Cerro Paurai-tepui, 4 ♂, 1 (♂); Cerro Auyan-tepui, 3 ♂, 2 ♀; Cerro Chimantá-tepui, 4 ♂, 2 (♂); Cerro Aprada-tepui, 1 ♂, 1 ♀, 1 (♂); Cerro Ptari-tepui, 9 ♂, 8 ♀, 4 (♂); Kabanayén, 1 ♂; Río Karuai, 1 ♀; Cerro Uei-tepui, 1 ♂; Arabupu, 1 ♂, 1 ♀; El Dorado, 1 ♂; Nuria, 1 ♂; Cerro Tomasote, 1 ♂; BRAZIL: Marurukao Creek, Rio Cotinga, 1 (♂); 23⁵.

*S. g. griseicapillus*³.—BOLIVIA: 2. BRAZIL: 16. PARAGUAY: 3.

*S. g. aequatorialis*³.—ECUADOR: 19. PERÚ, 7.

ARGENTINA: 20.

S. g. reiseri.—BRAZIL: 3³.

S. g. olivaceus.—BRAZIL: 2³.

*S. g. sylviellus*³.—BRAZIL: 22. ARGENTINA: 5.

Thripadectes holostictus holostictus (Selater and Salvin)

Automolus holostictus Selater and Salvin, Proc. Zool. Soc. London, p. 542, 1875 (1876). (Medellín, Colombia.)

2 ♂, 1 ♂. Río Chiquito, Hda. La Providencia, Táchira (south-western); 1900 meters.

These specimens extend the range of the species to Venezuela from Colombia and Ecuador.

Sclerurus albigularis kunanensis Aveledo and Ginés

Sclerurus albigularis kunanensis Aveledo and Ginés, Mem. Soc. Cien. Nat. La. Salle, No. 26, p. 66, 1950 (Kunana, Hoya del Río Negro, Perijá, Zulia.)

1 ♂, 1 ♀, 2 (♂), Cerro Alto del Cedro (summit, 450 meters), Colombian boundary, Montes de Oca, extreme northwestern Zulia.

These specimens constitute an extension of range to Colombia from the Venezuelan Perijá region. Camp was on the international boundary line, so the specimens are considered to be from both Venezuela and Colombia. For description of the locality see Phelps and Phelps Jr., Five New Venezuelan Birds and Nine Extensions of Ranges to Colombia, Proc. Biol. Soc. Wash., 68, p. 47, 1955.

These have been compared with 4 ♂ and 4 ♀ of *S. a. propinquus* Bangs the Santa Marta region, in the American Museum of Natural History.

In our collection are 21 additional specimens from the Río Negro, Perijá, region further to the south.

Thamnistes anabatinus gularis, new subspecies

Type: From Cerro El Teteo, Burgua, Estado Táchira, Venezuela; 1250 meters. No. 60633-A, Phelps Collection. Caracas. Adult male collected August 9, 1954, by Ramón Urbano. (Type on deposit at American Museum of Natural History.)

Diagnosis: Nearest to *T. anabatinus aequatorialis* Selater but differs from all races by darker, more ochraceous, less yellowish throat.

Range: Known from three specimens from Cerro El Teteo in the

⁴Specimens in American Museum of Natural History. For localities see Phelps and Gilliard, Am. Mus. Nov., No. 1100, p. 6, 1940.

⁵Specimens in Am. Mus. Nat. Hist. For localities see Zimmer, Bds. Perú, Am. Mus. Nov., No. 757, p. 10, 1934.

extreme southwestern part of the State of Táchira, in the forests of the lower Subtropical Zone at 1250 meters altitude.

Description of Type: Forehead Dresden Brown merging into the Prout's Brown of crown; nape and back Medal Bronze merging into the more olivaceous rump and more rufous upper tail-coverts; whitish shafts showing faintly on feathers of scapular region; and extensive semi-concealed back patch, the feathers with a dusky transverse bar, and basal half Cinnamon Rufous; a broad buffy whitish superciliary stripe commencing at base of bill; lores and a wide postorbital stripe darker than Medal Bronze. Chin buffy whitish; forethroat paler than Yellow Ochre merging into the browner than Ochraceous Tawny of median throat, which in turn merges into the olivaceous ochraceous of breast, which merges into the more olivaceous of abdomen and sides; flanks and under tail-coverts more grayish; thighs olivaceous brown. Inner vanes of primaries darker than Natal Brown and of secondaries brownish olive; tertiaries entirely olivaceous; outer vanes of primaries and secondaries, and upper wing-coverts, nearest to Brussels Brown, lighter on outer primaries; margins of inner vanes of remiges Salmon-Buff, progressively from the base to the middle. Middle rectrices Brussels Brown, others Antique Brown, all shaded with dusky on tips; under surfaces paler.

Bill (in life) "Maxilla black, mandible gray;" feet "olivaceous green;" iris "chestnut." Wing, 74 mm.; tail 66; exposed culmen, 17; culmen from base, 21; tarsus, 20.5.

Remarks: Sexes unlike in color. Size similar to *aequatorialis*. Range of measurements: two adult males (including type)—wing, 72-74 (73) mm.; tail, 60-66 (63); culmen from base, 21-21 (21); one adult female—wing, 72; tail, 62; culmen from base 22. Measurements of *aequatorialis*, from Ecuador³: five adult males—wing, 73-75.5 (74.4); tail, 55-63 (59.8); culmen from base, 21-22 (21.6); five adult females—wing, 72-78 (74.6); tail, 57-63 (59.6); culmen from base, 21-22 (21.5).

Females differs by lacking the dorsal patch.

The genus is new to Venezuela and the range of the species has been extended from the Bogotá region. It is possible that "Bogotá" specimens of *aequatorialis* (which we have not seen) belong to the new race inasmuch as Hellmayr⁶ says: "two 'Bogotá' skins differ from an east Ecuadorian specimen by deeper ochraceous throat and foreneck," which is the character of the new subspecies.

Specimens Examined

T. a. anabatinus.—GUATEMALA³: 4 [♂], 2 [♀].

*T. a. saturatus*⁸.—NICARAGUA: Chontales, 1 ♀; Río Coca, 1 ♂; Río Tuma, 1 ♂; Río Grande, 1 ♂. COSTA RICA: Bonilla, 3 ♂; Carillo, 2 ♂, 1 ♀; Volcán del Oso, 1 ♀; Río Naranjo, 1 ♀; Aquinares, 1 ♂, 1 ♀; Jiménez, 2 ♂; Guácimo, 1 ♀.

T. a. coronatus.—PANAMÁ: Cituro, 1 ♂³.

T. a. gularis.—VENEZUELA: Cerro El Teteo, Burgua, 2 ♂ (inc. type), 1 ♀.

*T. a. aequatorialis*³.—COLOMBIA: Mt. Macarena, 1 ♂, 1 ♀. ECUADOR: below San José, 3 ♂, 4 ♀; Río Suno, above Avila, 2 ♂, 1 ♀.

*T. a. intermedius*⁸.—COLOMBIA: Alto Bonito, 1 ♀. ECUADOR: La Chonta, 1 ♂, 1 ♀; Las Piñas, 1 ♀; Lita, 2 ♂, 1 ♀; Río Verde, 1 ♀.

*T. a. rufescens*⁸.—PERÚ: Río Inambari, 1 ♀; Río Távora, 1 ♀.

Ochthoeca cinnamomeiventris cinnamomeiventris (Lafresnaye)

Ochthoeca cinnamomeiventris cinnamomeiventris Lafresnaye, Rev. Zool., 6, p. 291, 1843. (Bogotá.)

1 ♂, 2 ♀, Río Chiquito, Hda. La Providencia, Táchira (south western); 1900 meters.

These specimens extend the range of the subspecies to Venezuela from the Colombian slopes of the Párama de Tamá.

Platyrinchus flavigularis flavigularis Sclater

Platyrinchus flavigularis flavigularis Sclater, Proc. Zool. Soc. London, p. 382, 1861. (Bogotá.)

This subspecies ceases to have a Venezuelan range. A Venezuelan range was given to it by Hellmayr⁷ based on a specimen in the Carnegie Museum from Guarico, Lara. This specimen has been examined by the senior author and found similar to the subspecies *P. flavigularis vividus*, described from a series of 20 specimens from the Perijá region by Phelps and Phelps Jr.⁸ Recently a specimen of *vividus* was collected also at Cerro El Teteo, southwestern Táchira.

Platyrinchus mystaceus neglectus (Todd)

Platyrinchus mystaceus neglectus (Todd), Proc. Biol. Soc. Wash., 32, p. 114, 1919. (La Colorada, Boyacá, Colombia.)

1 ♀ Cerro El Teteo, Burgua, southwestern Táchira; 1250 meters.

This specimen extends the range of the subspecies to Venezuela from Colombia.

This race was supposed to be that which inhabited the Perijá region of northwestern Zulia,⁹ but the Perijá population was found to be different and was subsequently described by us as *P. m. perijanensis*¹⁰.

Archiplanus leucoramphus leucoramphus (Bonaparte)

Xanthornus leucoramphus Bonaparte, Atti Sesta Riun. Sci. Ital., Milano, p. 405, (1844), 1845. ("Bogotá," Colombia.)

1 ♂, 1 ♀, Río Chiquito, Hda. La Providencia, southwestern Táchira; 1900 meters.

These specimens extend the range of the species to Venezuela from the Colombian slopes of the Párama de Tamá.

Tangara parzudakii parzudakii (Lafresnaye)

Tangara parzudakii Lafresnaye, Rev. Zool., 6, p. 97, 1843. (environs of Bogotá, Colombia.)

1 ♀, Río Chiquito, Hda. La Providencia, southwestern Táchira; 1900 meters.

This specimen extends the range of the species to Venezuela from Colombia.

⁸Birds of the Americas, etc., Part III, p. 113, 1924.

⁷Birds of the Americas, etc., Part V, p. 264, 1927.

⁹Proc. Biol. Soc. Wash., 65, p. 63, 1952.

¹⁰Phelps, W. H. Las Aves de Perijá, Bol. Soc. Ven. Cien. Nat., No. 56, p. 313, 1943.

¹¹Proc. Biol. Soc. Wash., 67, p. 109, 1954.

Compsocoma flavinucha victorini (Lafresnaye)

Tachyphonus victorini Lafresnaye, Rev. Zool., 5, p. 336, 1842.
("Bogotá," Colombia.)

6 ♂, 7 ♀, Río Chiquito, Hda. La Providencia, southwestern Táchira;
1900 meters.

This specimen extends the range of the subspecies to Venezuela from
Colombia.



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A NEW SUBSPECIES OF GOPHER FROG
(*RANA CAPITO* LECONTE)

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The Charleston Museum
Charleston 16, S. C.

The first record of the occurrence of *Rana capito* LeConte outside of the states of Florida and Georgia is that of Deckert (1920:26) who reported the taking of a specimen of the gopher frog near Pinelands, Hampton County, South Carolina. Chamberlain (1939:28) suggested that this record may actually refer to Pineland, Jasper County; Pineland lies approximately three miles south of the Hampton-Jasper county line in the latter county. The first North Carolina specimen was taken by Brandt (1936:220) in Beaufort County; gopher frogs were heard calling, and were observed in the Beaufort County region, but Brandt considered them the rarest frog of eastern North Carolina. A second North Carolina specimen was reported by Schwartz and Etheridge (1954:170), from Jones County. Two additional adults have been taken in South Carolina; both of these are from Berkeley County (Quinby and Harrison, 1956, in press). At the time that the present study was begun, there were thus only five specimens of *Rana capito* on record from localities north of the Savannah River.

Repeated attempts during the past three years to secure additional specimens of *Rana capito* from South Carolina have failed. Although tadpoles have been taken on one occasion, no calling adults or egg masses were ever encountered. On and before September 4, 1955, the coastal area of South Carolina was deluged with rain. In the vicinity of Charleston, 5.1 inches of precipitation were recorded, and ponds and borrow pits in the pine woods were flooded to a depth of as much as two feet. Low areas in the pinelands were likewise inundated. On this date, a single male gopher frog was heard calling from the edge of a borrow pit, .9 mi. N Cainhoy, Berkeley County, South Carolina, and a large chorus was heard and fifteen specimens collected in another, deeply flooded borrow pit at 6 mi. N Cainhoy, on South Carolina State Route

41. In an effort to locate additional frogs, on September 5, 1955, a trip was made to the southwestern portion of the state, and a large chorus was encountered in flooded pine woods, 2.5 mi. S Scotia, Hampton County. This locality is about 8 miles northwest of Pineland, and thus serves to confirm Deckert's original record for South Carolina. At this locality, twenty-two specimens were collected.

The latest revision of the frogs of the *Rana areolata* group (which includes *R. capito*) is that of Goin and Netting (1940). These authors described *Rana sevosia* from eastern Louisiana, and southern Mississippi and Alabama. They did not examine the two specimens then on record from North Carolina and South Carolina, but cited the counties whence these specimens had been taken in their thorough list of localities and references to frogs of this group. We have examined Brandt's specimen from North Carolina, but have been unable to locate Deckert's individual from Jasper County. The known distribution of *Rana capito* and *Rana sevosia* remains much as it was shown by Goin and Netting, although in a later paper (1942: 259), Netting and Goin recorded an additional specimen of *R. sevosia* from east of Mobile Bay; this is the first record of this frog from the east of that embayment. Brandt (1953: 144) recorded the taking of a *R. capito* in Bleckley County, Georgia.

Superficial examination of the forty specimens now available from South Carolina and two specimens from North Carolina indicated that these frogs were distinct from *R. capito* as known to us from Florida. In order to assess the differences between the more northern material and that from Florida, we have borrowed comparative material from the following collections, and wish to express our thanks to the curators who have allowed us to borrow material in their care: Charles M. Bogert and Richard G. Zweifel, American Museum of Natural History; (AMNH); Neil D. Richmond, Carnegie Museum (CM); Edward C. Raney, Cornell University (CU); G. J. Love, Emory University Field Station (EFS); Arthur Loveridge, Museum of Comparative Zoology (MCZ); Norman E. Hartweg and William E. Duellman, Museum of Zoology, University of Michigan (UMMZ); Doris M. Cochran, United States National Museum (USNM). Dr. Cochran and Dr. Remington Kellogg have allowed us to borrow the holotypes of *Rana capito* LeConte and *Rana aesopus* Cope, and Dr. Hartweg has loaned us a series of paratypes of *R. sevosia* Goin and Netting for comparison. In addition to the material from the collections noted above, we have studied the specimens in the Charleston Museum (ChM) and in the collection of the senior author (AS). We wish also to thank John A. Quinby and Charles H. Haddock for their assistance in collecting gopher frogs in South Carolina. All measurements are in millimeters.

Rana capito stertens, subsp. nov.

Holotype.—Charleston Museum 55.146.12, an adult male, from 6 mi. N Cainhoy, Berkeley County, South Carolina; taken September 4, 1955, by Julian R. Harrison, III, John A. Quinby, and Albert Schwartz.

Paratypes.—Fourteen specimens with the same locality data as the holotype, in the following collections: AMNH 58371, 58372; USNM 137279, 137280; CM 34060, 34061; UMMZ 113415, 113416; MCZ 28414, 28415; ChM 55.146.11 (4).

Distribution.—Known only from the lower Coastal Plain in South Carolina and North Carolina, north of the Savannah River.

Diagnosis.—A gopher frog related to *Rana capito capito* from Florida and southern Georgia, but differing from that subspecies in complete absence of yellow or straw colored dorsolateral folds, dark ground color on dorsum with consequently inconspicuous dorsal spots, transversely fused dark blotches on dorsum in sacral region, dark bars on femora distinctly wider than light interspaces and less boldly delineated, heavily spotted venter, and dorsolateral folds narrower and more prominent than in *R. capito*. From *R. c. sevosia*, *R. c. stertens* differs in broader and less prominent (lower) dorsolateral folds, dorsal glandular warts closely placed so as to be almost pavement-like rather than discrete as in *R. c. sevosia*, dorsal blotches in sacral region fused to form transverse bars.

Description of holotype.—An adult male with the following measurements: snout-vent length, 83.5; head length, 30.7; head width, 35.5; femur, 36.6; tarsus, 23.2; tibia, 39.2; fourth toe, 39.2; snout to naris, 7.4; naris to eye, 5.5; internarial distance, 5.3; interocular distance, 7.5; length of eye, 10.1; diameter of tympanum, 6.3; interolecranal extent, 62.5; intergenual extent, 67.8. Coloration of type (taken immediately before preservation: all capitalized color names from Ridgway, 1912): dorsal ground color Saccardo's Umber, blotches black; warts on sides and upper jaw Saccardo's Umber; dorsolateral folds Saccardo's Umber, indistinguishable from dorsal ground color; iris black flecked with gold; hind legs dorsally Saccardo's Umber, grading quickly to Old Gold on anterior aspect, thighs Primuline Yellow on mesad aspect; throat Naples Yellow; venter Light Cadmium, grading to Buff Yellow centrally; axillae Light Cadmium; ventral surface of hind legs Apricot Yellow. After preservation, the coloration is as described above except that all yellows have become faded to a dull buff. The general aspect is of a dark frog with inconspicuous dorsal blotches, and without yellow dorsolateral folds rather than a light gray or whitish frog with dark, discrete, conspicuous dorsal blotches (as in *R. c. capito*).

The dorsolateral folds begin on the snout above the nares and continue posteriorly almost to the groin; they are heavily pitted, and not prominent, but rather are low and relatively inconspicuous. Between the dorsolateral folds, the skin is raised in a series of glandular warts, less in width than the dorsolateral folds, and almost pavement-like (*ie.*, closely approximately with little unraised skin showing free between them). Four or five rows of warts lie between the dorsolateral folds, depending upon the size of the warts, which are smaller anteriorly, and tend to be fused longitudinally from the region of the shoulders posteriorly to form a series of four longitudinally linear warts, closely appressed between the dorsolateral folds. A labial ridge begins at the angle of the jaw and progresses over the shoulder to end abruptly posterior to the insertion of the forelimb. The dorsal pattern is composed of three to four longitudinal series of black blotches, more or less discrete anteriorly, and fused transversely from the region of the sacrum posteriorly. Below the dorsolateral folds, black blotches extend ventrally to the lateral margins of the belly. The dorsal aspect of the forearms shows three irregularly defined black bars, while

the upper arm has one poorly defined bar. There is a black spot at the elbow. All the bars and spots on the forelimbs are irregular in shape and the brown interspaces between the black bars have scattered black dots. The hindlimbs are likewise barred inconspicuously with black; there are four black bars on the femur, including a wide band at the groin, and four or five black bands on the tibia. These are irregularly in outline, wider than the brown interspaces (which are much stippled and mottled with black), and do not extend onto the ventral surface of the femora or tibiae respectively. The tarsus has two or three black bands on its posterior surface. These bands break up into blotches on the dorsal surface of the foot, thus giving the dorsal surface of the toes and web a mottled appearance. The concealed surface of the femur is heavily mottled and suffused with black, with two transverse bars moderately conspicuous.

The lips are brown, mottled with black. The venter is heavily pigmented with black. This ventral pigmentation is arranged as blotches from the region of the lower jaw posteriorly to the level of the forelimb and onto the ventral surface of that member. Immediately posterior to the forelimb, on either side, are a pair of black, crescentic irregular bars, which are curved about the insertion of the forelimb. The remainder of the venter is heavily stippled, clouded, and blotched with black, the individual markings being smaller centrally and somewhat larger and more conspicuous peripherally. The ventral aspect of the thighs is mottled with black, and the same condition persists on the ventral surface of the tibiae. The line of demarcation between the brown dorsal coloration and the buff ventral color is gradual rather than sharp.

In order of decreasing size, the fingers are 3-1-2-4, and digit 1 has a well developed gray pad on its medial aspect. The fingers are only very slightly webbed. The toes are slender and not dilated at the tips; in order of decreasing size, the toes are 4-3-5-2-1. The webbing on the hindfoot is moderate; the webbing extends onto the penultimate phalanx on digits 1, 2, 3, and 5, and extends to the penultimate articulation of the fourth toe.

Variation.—Of forty-one specimens of *R. c. stertens* at hand from North Carolina and South Carolina, ten are females. Sexual differences in the *Rana areolata* group of frogs are not marked; Goin and Netting (*op. cit.*:152) noted especially that in *R. capito*, males differ from females in having enlarged forearms, a gray nuptial pad on the inner side of the first finger, and lateral vocal pouches. They also stated that male *R. capito* often have the dorsolateral folds, warts, axillae and groin marked with yellow, and that females achieved the largest size. Other than regarding color, our specimens agree well with these statements. Since *R. c. stertens* is characterized by the lack of yellow or straw-colored dorsolateral folds, it is obvious that this criterion cannot be employed to ascertain the sex of an individual, and sex of individuals was determined by dissection. Since sexual differences are not pronounced, in the following discussion of color and pattern variation, both males and females are included as a unit.

The dark dorsal coloration and absence of distinctly colored dorsolateral folds is pronounced in the entire series. A single individual was kept alive in the laboratory for eight days; during this period, it displayed no

metachrosis and we thus assume that the dark coloration of the series is the customary one for this subspecies. In all, the ground color is dark, in most individuals so dark that the dorsal black blotches are observed with difficulty. The blotches themselves are usually closely approximated to each other and roughly circular to quadrate in shape. These black blotches are not confined to the dorsal warts, but rather indiscriminately lie across the warts and also encroach upon or overlie the dorsolateral folds, thereby rendering both dorsolateral folds and warts less obvious. In the sacral region, the dorsal black blotches are transversely elongate (due to the fusion of two adjacent blotches) and form a series of transverse blotches or bars. The ground color between the dorsal blotches is usually very restricted and much stippled or dotted with black.

The black bars on the thigh vary between 3 and 6; these bars are irregular in outline and conspicuously wider than the light interspaces, which are stippled and blotched with black. In some specimens the light interspaces are very restricted and almost limited to a light line between the wide black bars. The same condition applies to the tibial markings, which vary between 3 and 6. Again, these are only moderately distinct, wider than the accompanying light interspaces, and are often much broken and irregular at the edges. The entire animal gives the impression, when viewed dorsally, of a very dark frog with inconspicuously spotted dorsum and inconspicuously barred hindlimbs.

The dorsolateral folds are moderately broad and, although somewhat raised, are not so prominent as those of *R. c. sevosia* but are more prominent and narrower than those of *R. c. capito*. Thus, the dorsolateral folds are intermediate in condition between those of the remaining two subspecies, although the range of *R. c. stertens* is not intermediate between the ranges of *R. c. capito* and *R. c. sevosia*. The dorsal warts are much as those described in the type; they are usually closely approximated and broad, thereby almost filling the region between the dorsolateral folds. The warts are subcircular or elongate anteriorly, and, progressing posteriorly, become more linear and oblong, with the axis directed anteroposteriorly. Although generally discrete, the warts have a strong tendency to fuse longitudinally from the sacral region posteriorly.

The concealed surfaces of the thigh are very mottled or marbled with black, often to the exclusion of any conspicuous light areas. The mottling or marbling is often organized into one or two transverse poorly defined bars on the posterior surface of the thighs, or it may give the appearance of a continuation of the dark bars which cross the anterior and dorsal aspect of the thighs.

The venter is heavily spotted in all specimens. Anteriorly, on the throat and chest region, the dark pigmentation is usually confined to relatively large, pigmented areas, giving a mottled appearance. This mottled coloration continues onto the belly in some specimens (predominately so in females), where to the large blotches are often added minute stipples or cloudings of black, so that in extreme examples the belly is quite dark and heavily stippled and mottled with black as far posteriorly as the groin. The size of the black pigmented areas varies between individuals, and the posterior extent of the black pigmentation is likewise variable, but in almost all cases the venter is consistently

more heavily pigmented than the venter of *R. c. capito*.

Comparisons.—*Rana c. stertens* requires little comparison with *R. c. capito* from Florida and Georgia. The new subspecies is readily differentiated from the more southern race by virtue of its darker color and more obscure dorsal blotching, absence of yellow or straw-colored dorsolateral folds, heavily spotted venter, details of barring on the thighs, fusion of dorsal blotches in the sacral region, and more warty dorsum. We have examined the holotypes of *Rana capito* LeConte (USNM 5903, presumably from Riceboro, Liberty County, Georgia) and *Rana aesopus* Cope (USNM 4743, from Micanopy, Alachua County, Florida). The latter specimen is typical of specimens from Florida, displaying, despite its small size (snout-vent length 47.1 mm.) the straw-colored dorsolateral folds typical of Floridan *R. c. capito*. The holotype of *R. capito* is an adult male (snout-vent length 80.0 mm.); this specimen presently measures 26.7 mm. smaller than LeConte's (1855:425) original measurement, a fact already commented upon by Harper (1935:79, 81). The specimen is old and faded, and little indication of its original coloration yet remains. LeConte published a plate of this specimen, and comparison of the holotype and the figure indicates that the delineation in the latter is quite accurate. Since there is no indication, either on the specimen, plate, or from LeConte's description, of yellow dorsolateral folds, it might be argued that *R. capito* LeConte is the appropriate name for the gopher frogs north of the Savannah River; Riceboro is indeed approximately 30 miles below the Savannah River in Georgia. However Wright and Wright (1949:435) described both a male and female from the Okefinokee Swamp as possessing dorsolateral folds of a "honey yellow to mustard or buff" color in the former and "cream buff or tilleul buff" in the latter. It is possible that, when further specimens from Riceboro are available, that it can be shown that the population in Liberty County is intermediate between *R. c. capito* in southern Georgia and Florida and *R. c. stertens* north of the Savannah River. We have seen no material from Georgia and Florida which agrees with our concept of *R. c. stertens* as here defined.

Superficially, *R. c. stertens* and *R. c. sevosia* resemble each other insofar as dorsal coloration and pattern are concerned. The arrangement of *R. sevosia* as a subspecies of *R. capito* follows the usage of Schmidt (1953:79). There seems to be little evidence for this arrangement; no intergrades between *R. capito* and *R. sevosia* have been reported, although, as noted above, Netting and Goin (1942) reported a gopher frog from east of Mobile Bay, which "agrees with typical *sevosia* in morphology and ventral markings, but differs somewhat in dorsal pattern; the ground color is lighter gray, and the dark spots superimposed upon it are somewhat larger and less numerous than in the most *sevosia*. . . It is possible that the atypical dorsal pattern of this specimen may indicate some *capito* tendencies in the population east of Mobile Bay, and that *sevosia* and *capito* may be found to intergrade somewhere in the area between Baldwin County, Alabama, and Berrien County, Georgia." We have had available for examination one specimen (EFS 54, an immature individual, from 1 mi. SE Emory Field Station, Baker Co., Georgia) from the intervening area. This specimen is presently in poor condition, but it appears to represent the subspecies *capito*. Baker County is approximately 60 miles due west of Berrien County, the

previously western most locality for *R. c. capito* in southern Georgia.

Morphologically, *R. c. stertens* is readily distinguishable from *R. c. sevosia*. The development of the dorsal warts and the width and height of the dorsolateral folds immediately separate these two subspecies. Judging from the ten paratypes of *R. c. sevosia* which we have examined, we note that the dorsolateral folds are narrow and high in this subspecies, and on the other hand are broad and flatter in *R. c. stertens*. Although this is not a quantitative difference, it is nonetheless apparent when specimens of the two forms are compared. In *R. c. stertens*, the area between the dorsolateral folds is almost completely filled by the closely approximated dorsal warts, giving a pavement-like effect. In *R. c. sevosia*, the warts are discrete and separated from one another by intervening areas of rugose skin. The dorsal warts in *R. c. sevosia* are narrow and often quite linear. Although the posterior warts in *R. c. stertens* are often linear, they are always broader and not so highly raised. These structural features indicate to us that *R. c. stertens* is more closely related to *R. c. capito*, which occurs to the south, rather than to the western *R. c. sevosia*, which *R. c. stertens* resembles in coloration and pattern development.

Measurements taken in this study include snout-vent length, head width, and tibia length. This is in accordance with the view held by Goin and Netting (*op. cit.*:145) that these are the only measurements in anurans that can be taken with sufficient accuracy to be worth publishing. The writers also feel that fourth toe length is worthy of consideration and have accordingly included this measurement.

In *Rana c. stertens* there is a slight difference in size between males and females in all measurements except that of the fourth toe. These differences, are, however, only of one or two millimeters in magnitude, and are probably of minor importance (see Table 1). The measurements are based upon a relatively small series of specimens (ten females and twenty-nine males from South Carolina) and may have no real significance. In any case, sexual dimorphism with respect to size in *R. c. stertens* is not marked. It is apparent from Table 1 that, in *R. c. capito*, sexual dimorphism as related to snout-vent length is somewhat greater, although here again the small number of specimens must be taken into consideration. Comparisons with *R. c. sevosia* were made from figures given by Goin and Netting. It was felt that measurements taken by the writers on ten paratypes of *R. c. sevosia* from Mississippi were not adequate for comparison. On the basis of twenty-one males and twenty-nine females from Mississippi, their figures indicate that sexual dimorphism with respect to snout-vent length is even more apparent in *R. c. sevosia*. Here the difference between males and females is one of several millimeters.

Males and females of *R. c. stertens* average larger than males and females of *R. c. capito* from Georgia and North Florida. When compared with males and females of *R. c. capito* from central and southern Florida, males and females of *R. c. stertens* revealed no appreciable differences in size. *R. c. sevosia* (using Goin and Netting's figures) is closer, with respect to snout-vent length, to specimens of *R. c. capito* from Georgia and north Florida than it is to specimens of *R. c. stertens* from South Carolina or *R. c. capito* from central and southern Florida.

Three ratios were used in this study: snout-vent/head width, snout-

Table 1. Measurements (means and observed range) of specimens of *Rana capito* from four geographic areas

Males						
Locality	N	Snout-vent	Head length	Head width	Tibia	Toe 4
South Carolina	29	83.5 (72.5-90.7)	30.5 (26.5-33.3)	35.8 (31.0-39.5)	37.4 (33.5-41.7)	36.8 (31.7-41.9)
Georgia	5	70.5 (62.4-75.5)	28.4 (26.4-31.1)	32.6 (30.0-37.3)	37.9 (34.3-41.0)	34.0 (32.5-36.6)
North Florida	32	75.7 (60.5-94.7)	29.6 (25.7-35.7)	33.7 (29.8-41.1)	37.7 (32.3-48.2)	34.9 (31.1-40.3)
Central & southern Florida	11	80.4 (67.0-94.5)	31.0 (28.9-35.8)	34.8 (31.4-40.3)	39.0 (33.1-40.3)	35.6 (32.1-41.1)
Females						
South Carolina	10	86.4 (80.2-94.5)	31.1 (28.5-33.2)	37.1 (33.0-40.2)	38.2 (35.0-41.7)	36.7 (34.0-38.4)
Georgia	5	81.2 (63.4-94.0)	31.5 (25.8-36.1)	35.8 (27.5-40.4)	41.4 (37.4-45.6)	36.6 (32.1-41.0)
North Florida	19	76.0 (58.5-88.2)	30.4 (25.0-34.8)	34.6 (27.2-40.4)	37.9 (30.7-42.4)	34.7 (29.7-38.8)
Central & southern Florida	8	86.1 (73.8-100.2)	32.1 (28.8-36.1)	36.4 (32.5-40.0)	40.1 (34.1-45.5)	37.2 (34.8-44.6)

Table 2. Ratios (means and observed range) of *Rana capito* from four geographic areas. Number of specimens as in Table 1.

Locality	snout-vent/ head width	snout-vent/ head length	snout-vent/tibia
South Carolina	2.33 (2.18-2.56)	2.75 (2.60-3.04)	2.24 (2.10-2.50)
Georgia	2.23 (1.98-2.41)	2.53 (2.26-2.71)	1.92 (1.70-2.13)
North Florida	2.24 (2.02-2.47)	2.55 (2.03-2.85)	2.02 (1.73-2.27)
Central and southern Florida	2.35 (2.03-2.63)	2.64 (2.32-2.88)	2.13 (1.79-2.34)

vent/head length, and snout-vent/tibia. Table 2 indicates the possibility of a cline with respect to the snout-vent/tibia ratio. In specimens of *R. c. capito* from central and southern Florida this ratio averages 2.13 (1.79-2.34), and 2.02 (1.73-2.27) in specimens from north Florida. In Georgia specimens of *R. c. capito*, this ratio averages 1.92 (1.70-2.13). Apparently tibia length increases slightly in size northward in the range of *R. c. capito*. There is no appreciable difference in snout-vent/head width ratios between *R. c. stertens* and *R. c. capito*. The ratio of snout-vent/head length is slightly higher in *R. c. stertens* than it is in *R. c. capito* from Georgia and North Florida. In *R. c. capito* from Central and southern Florida this ratio is closer to that of *R. c. stertens*. Goin and Netting's figures indicate that this ratio is somewhat higher in *R. c. sevosia*. With the exception of the snout-vent/tibia ratio, the values given by Goin and Netting for snout-vent/head length were higher than the values found by the writers for *R. c. capito* and *R. c. stertens*. The former ratio is higher in *R. c. stertens* than in *R. c. sevosia* (1.9-2.3; average 2.1).

Specimens examined.—One hundred and forty, as follows: *Rana c. stertens*: NORTH CAROLINA: *Beaufort Co.*, Washington, 1 (MCZ 21201); *Jones Co.*, 2.4 mi. N. Maysville, 1 (ChM 55.44.7). SOUTH CAROLINA: *Berkeley Co.*, 6 mi. N. Cainhoy, 15 (ChM 55.146.12 (holotype); AMNH 58371-2, USNM 137279-80, CM 34060-1, UMMZ 113415-6, MCZ 28414-5, ChM 55.146.11 (4), (all paratypes); 16 mi. NNE Charleston, 1 (ChM 51.28.4); 5 mi. NE Summerville, 1 (ChM 55.90.7); *Hampton Co.*, 2.5 mi. S Scotia, 22 (ChM 55.146.9). *Rana c. sevosia*: MISSISSIPPI: *Jackson Co.*, Vestry, 10 (UMMZ 71777, UMMZ 76921 (paratypes)). *Rana c. capito*: FLORIDA: *Alachua Co.*, Micanopy, 1 (USNM 4743 (type of *aesopus*)); Gainesville, 13 (UMMZ 76922, UMMZ 57771-2, CU 2158, CU 4030, AMNH 32827, AMNH 37084, AMNH 37086); near Gainesville, 1 (CM 21434); 3 mi. E Gainesville, 1 (CM 20245); "Twin Oak Pond," 1 (UMMZ 100963); no precise locality given, 1 (UMMZ 57877), 2 (AMNH 52480-1); *Charlotte Co.*, Englewood, 1 (ChM 39.277.8); *Citrus Co.*, 3 mi. W Dunnellon, 1 (CM 28457); *Duval Co.*, Dinsmore, 4 (AMNH 15979-15982); *Highlands Co.*, Archbold Biological Station, near Hicoria, 1 (AMNH 52006); *Levy Co.*, no locity given, 3 (USNM 57533-57534, USNM 57658); *Marion Co.*, Silver Springs, 2 (UMMZ 95542); Lake Kerr, 28 mi. NE Ocala, 3 (CM 9832-9834); Eureka, 13 (AMNH 5898-5899, AMNH 5925-5929, AMNH 5933-5934, 5937, AMNH 5941-5943); Seven Oaks, 1 (AMNH 2982); 20 mi. NW Umatilla near Silver Springs, 1 (AMNH 45141); no precise locality given, 1 (USNM 61062); *Nassau Co.*, 17 mi. S. Hilliard, 1 (CU 811); Little St. Mary's River, 1 (CM 23465); *Okeechobee Co.*, .5 mi. N

Okeechobee, 1 (AMNH 54346); *Orange Co.*, Orlando, 2 (UMMZ 54085, AMNH 268); *Pinellas Co.*, St. Petersburg, 2 (CU 1500); *Polk Co.*, Auburndale, 1 (USNM 59413); *Putnam Co.*, 3 (USNM 21702-21704); *Sarasota Co.* 2.2 mi. NW Englewood, 1 (UMMZ 109256); Englewood, 9 (UMMZ 109257, CM 23447); 1.6 mi. NW Englewood, 1 (AS 311); county indeterminate, Ocklawaha River, 2 (CU 1690). GEORGIA: *Baker Co.*, 1 mi. SE Emory Field Station, 1 (EFS 54); *Berrien Co.*, Nashville, 1 (USNM 11897); *Ware Co.*, Chesser's Island, Okefinokee Swamp, 9 (CU 125-128, CU 809-810, CU 812-814); *Liberty Co.*, Riceboro, 1 (USNM 5903 (type of *capito*)).

LITERATURE CITED

- Brandt, B. B. 1936. The frogs and toads of eastern North Carolina. *Copeia*, 4:215-223.
- 1953. Salientia of Bleckley County, Georgia, and vicinity. *Herpetologica*, 9(3):141-145.
- Chamberlain, E. Burnham. 1939. Frogs and toads of South Carolina. *Charleston Mus. Leaflet* 12:1-38.
- Deckert, R. F. 1920. Note on the Florida gopher frog. *Copeia*, no. 80:26.
- Goin, Coleman J., and M. Graham Netting. 1940. A new gopher frog from the Gulf Coast, with comments upon the *Rana areolata* group. *Ann. Carnegie Mus.*, 28:137-168.
- Harper, Francis. 1935. The name of the gopher frog. *Proc. Biol. Soc. Wash.*, 48:79-82.
- LeConte, John. 1855. Descriptive catalogue of the *Ranina* of the United States. *Proc. Acad. Nat. Sci. Phila.*, 7:423-431.
- Netting, M. Graham, and Coleman J. Goin. 1942. Additional notes on *Rana sevosa*. *Copeia*, 4:259.
- Quinby, John A., and Julian R. Harrison, III. 1956. Additional information concerning some South Carolina amphibians and reptiles. *Herpetologica*, in press.
- Ridgway, Robert. 1912. Color standards and color nomenclature. Published by the author, Washington, D. C., pp. i-iii, 1-43, 53 plates.
- Schmidt, Karl P. 1953. A check list of North American amphibians and reptiles. *Amer. Soc. Ichth. and Herp.*, pp. v-viii, 1-280.
- Schwartz, Albert, and Richard Etheridge. New and additional herpetological records from the North Carolina Coastal Plain. *Herpetologica*, 10(3):167-171.
- Wright, Albert H., and Anna A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Comstock Publ. Co., Ithaca, N. Y., pp. vii-xii, 1-640.



PROCEEDINGS
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THE COTTONTAIL RABBITS (*SYLVILAGUS
FLORIDANUS*) OF PENINSULAR FLORIDA

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When Nelson (1909) revised the rabbits of North America, he assigned all specimens of *Sylvilagus floridanus* from Florida to two subspecies: *Sylvilagus f. floridanus* (Allen) and *Sylvilagus f. mallurus* (Thomas). The former (type locality, Micco, Brevard Co., Florida) occurs throughout peninsular Florida from sea level to about the 100 foot contour, and occupies all of the southern portion of the peninsula, northward to St. Augustine on the east coast and to an unknown distance on the west coast. The northernmost locality of the west coast from which the subspecies *floridanus* has since been recorded is Gulf Hammock, Levy County (Pearson, 1954:479). *S. f. mallurus* (type locality, Raleigh, Wake Co., North Carolina) occupies west and north Florida, and extends southward onto the peninsula, in the interior, as far as Lake Julian, Polk Co. Later, Howell (1939:365) described *S. f. ammophilus* from Oak Lodge, opposite Micco, Brevard Co., Florida; the range of this subspecies is restricted to the offshore island or "peninsula" upon which the type locality lies. Hall (1951b:154) cited no new localities whence *S. f. ammophilus* has been recorded.

The three forms of *Sylvilagus floridanus* currently recognized as occurring in Florida may be briefly differentiated as follows: 1) *S. f. floridanus*—a small, dark, cottontail with short ears and proportionately large tympanic bullae; 2) *S. f. ammophilus*—similar in size to *S. f. floridanus*, but upper parts, sides, head, and ears paler (less blackish); 3) *S. f. mallurus*—larger than either *S. f. floridanus* or *S. f. ammophilus*, with upper parts less heavily washed with black than *S. f. floridanus*; darker than *S. f. ammophilus*; skull larger than that of either of the other two Floridian forms.

At the time of Nelson's revision, apparently there was but a single cottontail available for study from southeastern Florida; Nelson listed (*op. cit.*: 165) one specimen from Miami. Bangs (1898: 175) had pre-

vously recorded the occurrence of cottontails (as *Lepus (Sylvilagus) sylvaticus floridanus* Allen) from as far south as Miami. Field work conducted by the writer in southern Florida during the past seven years has shown that cottontails occur south of Miami along the lower east coast, and specimens have been collected as far south as the vicinity of Homestead, which lies 27 miles southwest of Miami.

Along the lower Florida east coast, cottontails have never been observed as being numerous. They inhabit the pine woods which occur to the east of the Everglades in this area; these open pine woods occur on the East Coast Ridge, an outcropping of oolitic limestone, raised above the level of the Everglades, and nowhere more than about 20 miles in width. To the north of Miami, this oolitic outcropping is replaced by sandy pinewoods, which extend as far north as about the latitude of Hobe Sound, Martin County. In some regions, these sandy pinewoods are replaced by rolling hills and sandy dunes which support growth of scrub oak and rosemary (*Ceratiola ericoides*), rather than the usual pines. The Everglades and their associated swamps and marshes border the pinewoods on the west, and thus a long tongue of sandy and rocky pineland extends from central Martin County south to southern Dade County, a distance of about 120 miles. This tongue of suitable habitat is limited on the east by the Atlantic Ocean, and on the west by the Everglades; the 'Glades are not inhabited by cottontails, but are rather the principal region in southern Florida occupied by the marsh rabbit, *Sylvilagus p. paludicola*. The only area of contact between the cottontails which inhabit this eastern isolated tongue of pineland and the cottontails farther to the north lies in southern Martin County. Under these circumstances, it is not surprising that study of recently collected material from southern Florida as well as additional specimens from farther north in the state shows that the cottontails inhabiting the lower Florida east coast represent a recognizable and unnamed subspecies of *S. floridanus*.

I wish to thank the following curators for allowing me to examine pertinent material in their collections: William H. Burt (Museum of Zoology, University of Michigan), Charles O. Handley, Jr. (United States National Museum), Miss Barbara Lawrence (Museum of Comparative Zoology), James N. Layne (University of Florida), and Oscar T. Owre (University of Miami). In addition, I have examined specimens in the collection of the Charleston Museum and my own collection. L. Neil Bell, Edwin L. Blicht, George P. O'Malley, Dennis R. Paulson, John R. Porter, and Raymond P. Porter have given me much assistance in collecting cottontails throughout Florida, and their help is hereby gratefully acknowledged.

All measurements are in millimeters and all capitalized color names are from Ridgway (1912). Skull measurements were taken in the manner of Nelson (*op. cit.*) as clarified by Hall (1951a: 47). Zygomatic breadth was taken as the widest measurement of the posterior third of the zygomatic arch. In some specimens, the ventral shelf at the anterior root of the zygoma is well developed and the arch is wider at this point. However, for the sake of consistency and comparable measurements, the posterior zygomatic breadth only was taken and employed in the present paper.

The cottontails of the lower Florida east coast, which I name after Dennis R. Paulson of Miami, Florida, may be known as

***Sylvilagus floridanus paulsoni*, subsp. nov.**

Holotype.—Charleston Museum 56.14, an adult female, skin and skull, taken 6 miles north of Homestead, Dade County, Florida, by George P. O'Malley, February 6, 1951. Original number 1718.

Diagnosis.—A small member of the *Sylvilagus floridanus* complex of races, smaller than the three remaining subspecies (*floridanus*, *ammophilus*, *mallurus*) inhabiting Florida. Measurements of total length, tail and hind foot average smaller than those of the remaining Floridian subspecies. Cranially, averaging smaller in all measurements except interorbital breadth, and especially in measurements of zygomatic breadth, and length of upper molar tooth row. Dorsum pale, less washed with black than *floridanus* or *mallurus*, and sides more gray than in these two forms. Compared with *ammophilus*, *paulsoni* grayer on sides, less washed with black on rump, and dorsal coloration less bright.

Distribution.—Lower Florida east coast, from Palm Beach County south to Dade County.

Description of holotype.—External measurements: total length, 370; tail, 45; hind foot, 85; ear from notch, 60. Cranial measurements: greatest length, 68.8; basilar length, 53.8; zygomatic breadth, 33.4; length of nasals, 26.8; width of nasals, 13.3; interorbital breadth, 17.4; breadth of braincase, 26.0; length of upper molar tooth row, 12.6; diameter of tympanic bulla, 11.0. At time of collection, the type was lactating, and also contained two fetuses, each measuring 67 mm. in total length.

Coloration, (in winter pelage) Avellaneous dorsally, relatively lightly (as compared with *floridanus* and *mallurus*) overlaid with black. Sides Tilleul-Buff, mixed with black, and sharply delimited from the white venter. Side patches Vinaceous-Buff; crown and nape patch Cinnamon. Front feet Light Pinkish Cinnamon, grading to Cinnamon on the upper arm. Hind feet white, grading quickly to Light Pinkish Cinnamon on the upper leg. Soles of front and hind feet Pinkish Buff. Ventrally, throat Pinkish Buff; lateral patch Light Pinkish Cinnamon. Rump Vinaceous-Buff, intermixed with black. Ears slightly edged with blackish on the anterior margins. Tail white ventrally, Pinkish Buff mixed with black dorsally.

Variation.—Ten adults from Dade and Brevard counties, Florida, resemble the type in their pale coloration. Only one of these specimens is in winter pelage and this individual resembles the type in coloration. The remaining nine specimens all show some degree of wear, but are distinctly paler than specimens of *floridanus* and *mallurus* in comparable worn pelage. The tendency for worn pelage to lose some of the buffy tints has been pointed out by Nelson (*op. cit.*: 162), and specimens of *paulsoni* in worn pelage show that the dorsal buffy area fades considerably and in some individuals is almost indistinguishable from the color of the sides, blending imperceptibly into the paler lateral coloration.

Comparisons.—Comparison of *S. f. paulsoni* with the three remaining subspecies of cottontail in Florida reveals the following. *S. f. paulsoni* can be easily distinguished from the races *floridanus* and *mallurus* by its distinctly paler dorsal coloration; the central buffy area on the dorsum

is not only paler in coloration (Cinnamon in topotypes of *floridanus* and in South Carolina specimens of *mallurus*) but also in the reduction of black hairs overlying the buffy areas of the dorsum. Thus, the dorsum of *floridanus* and *mallurus* is not only brighter in coloration but also darker due to the heavy wash of black. From *S. f. ammophilus*, *paulsoni* differs in having the rump less heavily overlaid with blackish hairs. The dorsal coloration of these two races is quite similar, although *ammophilus* seems somewhat brighter (Pinkish Cinnamon) in fresh pelage. Howell (*loc. cit.*) differentiated *ammophilus* from *floridanus* on the basis of upper parts, sides, head, and ears paler (less blackish), and the nape patch being a paler shade of tawny. These characters will separate *ammophilus* from *floridanus* without difficulty, but the resemblance in coloration between *ammophilus* and *paulsoni* is very close. The similarity between *ammophilus* and *paulsoni* may well be due to the similar habitat which both occupy. The xeric sandy and rocky soils of the East Coast Ridge and the sandy soil of the off-shore island which *paulsoni* and *ammophilus* inhabit respectively have probably brought about the paler coloration of these two populations through selective mechanisms, and the resemblance between the two subspecies thus expresses convergence due to similar habitat rather than close genetic relationship. It is interesting to note that the type locality of *S. f. floridanus* lies on the mainland opposite Oak Lodge, the type locality of *ammophilus*, and from localities farther south on the Florida mainland, rabbits showing the dark coloration of *floridanus* have been examined.

Cranially, *S. f. paulsoni* averages smaller in all measurements taken (see Table 1) except interorbital breadth. The skulls of *S. f. mallurus* are noticeably larger and more robust than are those of *floridanus*, *paulsoni*, and *ammophilus*. Comparison of the cranial measurements of *ammophilus*, given by Howell in the original description of that form, with those of *paulsoni* in Table 1, show that the latter averages smaller than *ammophilus* except in breadth of braincase, which is narrower in *ammophilus*. It should be noted that, when series of these four subspecies are compared, the differences between the cranial measurements of such externally different and recognizable subspecies as *mallurus* and *floridanus* are relatively slight. The differences between cranial measurements of *paulsoni* and the remaining Floridian subspecies are of the same degree as those separating other subspecies of *Sylvilagus floridanus* in the southeast.

Remarks.—Intergradation between *S. f. floridanus* and *S. f. paulsoni* is demonstrated by two specimens from Palm Beach County, Florida. Both are in fresh pelage, and both are intermediate in dorsal coloration between *paulsoni* and *floridanus*, although closer to the latter form in the heavy wash of black over the dorsal buffy area. One of these specimens is a skin without skull. The other (an adult female) has long ears (67 mm.) characteristic of *floridanus*, and on the basis of skull measurements, can be placed with either subspecies with equal propriety. In the list of specimens examined, these two individuals have been called *floridanus*, although they are considered intermediate between this subspecies and *paulsoni*.

Examination of additional material from Florida allows for clarification of the ranges of the other forms of *S. floridanus* in the state. A single specimen without skull from the south end of Merritt Island,

Table 1. External and cranial measurements (means and observed ranges) of three subspecies of *Sylvilagus floridanus*.

	<i>S. f. mallurus</i> (14 ♂, 10 ♀)	<i>S. f. floridanus</i> (20 ♂, 9 ♀, 1 ♀)	<i>S. f. paulsoni</i> (4 ♂, 7 ♀)
Total length	424 (367-465)	414 (355-485)	397 (370-424)
Tail	50 (40-70)	49 (37-70)	44 (32-51)
Hind foot	95 (84-103)	89 (75-95)	87 (80-93)
Ear from notch	63 (57-66)	59 (55-78)	60 (56-62)
Greatest length	74.1 (67.2-80.0)	72.5 (68.9-75.9)	70.7 (68.8-75.8)
Basilar length	56.2 (47.0-60.8)	55.3 (51.9-58.1)	53.5 (52.4-55.9)
Zygomatic breadth	36.1 (35.1-37.2)	38.8 (33.0-37.5)	34.2 (32.9-35.3)
Length of nasals	31.3 (28.7-34.4)	30.3 (28.2-32.7)	29.1 (26.8-32.9)
Width of nasals	15.2 (13.0-17.8)	14.2 (12.3-15.9)	14.1 (12.9-15.4)
Interorbital breadth	18.0 (16.5-20.2)	17.1 (15.4-19.2)	17.4 (16.4-18.5)
Breadth of braincase	28.1 (26.4-29.3)	26.2 (22.2-27.8)	26.0 (25.6-26.8)
Upper molar tooth row	14.4 (13.0-16.2)	14.0 (12.4-15.1)	13.6 (12.6-15.1)
Diameter of tympanic bulla	11.7 (10.8-12.5)	11.3 (9.4-12.5)	11.1 (10.2-11.8)

Brevard County, Florida, is assignable to the subspecies *floridanus* rather than *ammophilus* on the basis of its heavy wash of black over the dorsal buffy area. It might be expected that this island would be inhabited by *S. f. ammophilus*, which occurs on the next adjacent island to the south and east, but this does not appear to be the case.

Pearson (*loc. cit.*) reported the occurrence of *S. f. floridanus* at Gulf Hammock, Levy County, Florida. I have examined four adult specimens from Gulf Hammock, and these individuals are definitely assignable to *mallurus* rather than the nominate form. They can be easily distinguished from *floridanus* by their large size; in fact, the skulls of the Gulf Hammock series are larger than most specimens of *mallurus* from South Carolina, Georgia, and interior Florida. The presence of *S. f. mallurus* at Gulf Hammock clarifies the ranges of *mallurus* and *floridanus* along the Florida west coast. The northwesternmost station of occurrence of *floridanus* has previously been reported as Blitches Ferry, Citrus County, (Nelson, *op. cit.*: 165) whereas *mallurus* has been reported only from Gainesville in the north central section of Florida. The occurrence of *mallurus* at Gulf Hammock indicates that this subspecies occurs approximately as far south as the Withlacoochee River on the Florida Gulf Coast, and *floridanus* apparently occurs to the south of this river in Citrus County.

Specimens examined.—*Sylvilagus f. mallurus*. North Carolina, Macon Co., 1.1 mi. SE Highlands, 1. South Carolina, Oconee Co., 1.6 mi. N. Salem, 1; McCormick Co., 2 mi. NE McCormick, 2; Georgetown Co., 12 mi. S Georgetown, Kinloch Plantation, 1; Berkeley Co., 1 mi. N Cainhoy, 1; Otranto, 1; Charleston Co., St. Andrews Parish, 2; Wadmalaw Island, 1; 4.1 mi. W Charleston, 1; John's Island, 1. Georgia, Chatham Co., Barnwell Island, 2. Florida, Alachua Co., Gainesville, 11; Levy Co., Gulf Hammock, 5; 2 mi. NW Janney, 1; Lake Co., Leesburg, 1.

Sylvilagus f. ammophilus. Florida, Brevard Co., 9.5 mi. S Indialantic, 4; 11 mi. S Indialantic, 1; 11.8 mi. S Indialantic, 1; 12 mi. S Indialantic, 1.

Sylvilagus f. floridanus. Florida, Putnam Co., Welaka Reserve, Welaka, 4; Polk Co., Crooked Lake, 1; Brevard Co., Micco, 8; Merritt Island, 1; Osceola Co., Camp Hammock, 4; Charlotte Co., 3¼ mi. SW Punta Gorda, 2; 6 mi. S Punta Gorda, 1; Englewood, 1; Pinellas Co., Tarpon Springs, 1; Glades Co., 10 mi. N Moorehaven, 5; 6 mi. S, 1 mi. E Moorehaven, 1; Collier Co., Immokalee, 2; Naples, 1; Palm Beach Co., Lake Worth, 1; Lantana Road and Military Trail, 1.

Sylvilagus f. paulsoni. Florida, Broward Co., Ft. Lauderdale, 3; Dade Co., Miami, 6; Coral Gables, 1; Hialeah, 1; 6 mi. W Perrine, 1; 6 mi. N Homestead, 1 (holotype); 7.3 mi. N Homestead, 1; 8 mi. N Homestead, 1; 9 mi. N Homestead, 1.

LITERATURE CITED

- Bangs, Outram. 1898. The land mammals of peninsular Florida and the coast region of Georgia. *Proc. Boston Soc. Nat. Hist.*, 28: 157-235.
Hall, E. Raymond. 1951a. Mammals obtained by Dr. Curt von Wedel from the barrier beach of Tamaulipas, Mexico. *Univ. Kansas, Mus. Nat. Hist.*, 5 (4): 33-47.
———. 1951b. A synopsis of the North American Lagomorpha. *Univ. Kansas, Mus. Nat. Hist.*, 5 (10): 119-202.

- Howell, Arthur H. 1939. Descriptions of five new mammals from Florida. Jour. Mamm., 20 (3): 363-365.
- Nelson, E. W. 1909. The rabbits of North America. North Amer. Fauna, 29: 1-314, 13 plates.
- Pearson, Paul G. 1954. Mammals of Gulf Hammock, Levy County, Florida. Amer. Mid. Nat., 51 (2): 468-480.
- Ridgway, Robert. 1912. Color standards and color nomenclature. Washington, D. C., pp. i-iii, 1-43, 53 plates.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW NEOTROPICAL HYDROMETRIDAE
(HEMIPTERA)

BY CARL J. DRAKE,

Ames, Iowa

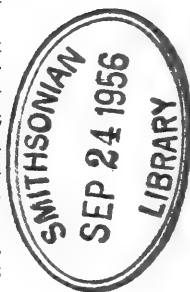
The present paper contains the descriptions of three new species of marsh-treaders from the Americas. The types are in my personal collection. In the structural measurements, 80 units equal one millimeter.

Hydrometra aemula, new sp.

Moderately long, brownish testaceous with silvery white spots on lateral sides of abdomen (one on both of the sides of each abdominal segment—at anterior margin just under connexivum); body beneath flavotestaceous; abdominal tergites above dark fuscous except last one; connexiva (both upper and lower faces) flavous with exteromargin dark brown. Head a little dilated in front, with anteocular part twice as long as postocular (160:80); interocular sulcus above shallow, short, scarcely as long as an eye; eyes reddish, prominent; clypeus small, widest at middle, abruptly narrowed in front; labium extending about one-third of postocular length beyond eyes. Antenna long, slender, mostly dark fuscous with apical three-fourths of first segment blackish fuscous. measurements—I, 50; 11, 68; III, 210; IV, 120.

Pronotum 2.00 mm. long, strongly broadly constricted between lobes, with the pale color of median longitudinal line becoming evanescent posteriorly; anterior lobe of pronotum without punctures except encircling row of pits at base of collar, shorter than hind lobe (60:72); posterior lobe with many pits, a row of pits in median longitudinal line, numerous pits irregularly arranged on each side of median line, all pits deep with sharply cut edges and sides. Wing pads slender, straplike, 1.50 mm. long, extending a little beyond metanotum. Propleura with three or four pits.

Anterior acetabulum with 6 pits in front of cleft and 7-9 behind it; middle acetabulum with 5 pits in front of cleft and 8 behind it; hind acetabulum with 9 scattered pits; all pits sharply cut, deep and easily seen. Front legs with femora reaching to base of antennae, 2.90 mm. long; tibiae 3.40 mm. long. Middle legs with femora 3.50 mm. long; tibiae 3.65 mm. long. Hind legs with apex of femora extending a little beyond apex of abdomen, 4.30 mm. long; tibiae 4.90 mm. long. Female with tergite VII distinctly raised posteriorly, not widened, produced or



modified at apex; connexiva narrowed posteriorly, terminating in an acute angle at apex of VII tergite; VIII segment above feebly sloping downward posteriorly, terminating behind in a straight, pointed process. Male and alate forms of both sexes unknown.

Length, 10.00 mm.; width, 0.95 mm.

Holotype (female), Hermosillo, Mex., Aug., 1952, C. J. Drake.

Similar to *H. lentipes* Champion in size and general aspect, but easily separable by large silvery white spots on sides of body and the shape of VII tergite in female.

***Hydrometra adnexa*, new sp.**

Moderately large, fairly stout, brown-testaceous, the lateral sides of abdominal segments with large silvery spots (a spot at anterior margin of segments II-VIII just beneath connexiva; all spots plainly visible from dorsal view). Head moderately dilated in front, 3.10 mm. long, dorsal interocular sulcus about as long as an eye; antecular part twice as long as postocular (160:80); labium reaching slightly beyond middle of postocular part. Antennal measurements—I, 40; II, 72; III & IV wanting.

Pronotum 1.60 mm. long, with anterior lobe shorter than posterior lobe (53:75); anterior lobe impunctate, except encircling row of pits just behind front margin; posterior lobe with pits shallow, not very numerous, difficult to see without wetting surface, with a few pits in median longitudinal line and scattered pits on each side of it. Elytral pads straplike, barely extending to abdomen. Abdomen 4.00 mm. long, with tergite VII raised posteriorly and beset with a transverse row of stiff, rather short, dark fuscous hairs on apical margin; connexiva narrowed apically, not produced or modified behind, acutely angulate at apex. Female genital segment (VIII) above sloping obliquely downward posteriorly and ending in a stout, rounded, pointed process.

Anterior acetabula with one pit on each side of cleft on left side and one in front of and two behind cleft on right side. Middle acetabula with one pit on each side of cleft on both sides of thorax. Hind acetabula with two pits on left side and three on right side (two seem to be the usual number); all pits small but readily seen when wet). Anterior femora with apex scarcely reaching base of antenniferous processes, 2.80 mm. long. Middle femora 3.20 mm. long, the tibiae 3.50 mm. long. Hind femora just reaching apex of abdomen, 3.50 mm. long, the tibiae 4.25 mm. long. Male unknown, also macropterous forms.

Length, 10.00 mm.; width, 0.75 mm.

Holotype (apterous female), Barro Colorado, Canal Zone, Panama, Feb. 6-8, 1939, C. J. Drake.

This species is stouter than *H. australis* Say and has 2 or 3 pits on the hind acetabula. In fact the acetabular pits distinguish *adnexa* from other species found in Panama and nearby countries.

***Hydrometra fruhstorferi* Hungerford and Evans**

Hydrometra fruhstorferi Hungerford & Evans, 1934, Ann. Mus. Nat. Hung. 28:99-100 pl. 10 (Espirito-Santo, Bras.)

Hydrometra brasilana Drake, 1952, Acta Ent. Mus. Nat. Pragae 26:6-7 (Nova Teutonia, St. Catarina, Bras.). (New synonymy).

As the type specimens of *H. fruhstorferi* H. & E. and *H. brasilana* Drake are inseparable and the same species, the latter is here suppressed as a synonym (new synonymy).

***Bacillometra fuallagana*, new sp.**

Macropterous form: Fairly stout, with long slender appendages, dark to blackish brown with some fuscous, the broad, median, longitudinal, grayish yellow stripe interrupted a few times with fuscous; hemelytral veins dark fuscous, with two closed cells; body beneath blackish or blackish fuscous. Head moderately enlarged at apex, 2.00 mm. long, with prominent reddish eyes; interocular space half as wide as an eye; antecular part a little more than twice the length of postocular (150:64); ventral sulcus deep, extending from slightly in front of eyes to base of head; rostrum very long, not quite reaching to base of head. Antennae very long, slender, measurements—I, 50; II, 92; III, 240; IV, 160. Head and pronotum clothed with short, whitish, setalike, pubescent hairs.

Pronotum 1.30 mm. long; anterior lobe, without pits except encircling row of moderately large pits a little back of front margin; posterior lobe approximately one and a half times as long as front lobe (65:42), provided with numerous pits (more readily seen after wetting surface), with several pits on median line, a short row of pits in the lightly impressed area on each side between the two lobes, the pits on each side of median longitudinal line scattered. Scutellum blackish. Anterior femora reaching a little in front of head, the posterior femora extending nearly one-fifth of its length beyond apex of abdomen. Hemelytra not entirely covering sides of connexiva, sometimes reaching almost to apex of abdominal tergite VII, frequently not beyond basal half of VII. Mesosternum with a median longitudinal sulcus; metasternum bifurcate with a median ridge between the two furrows; ventrites II, III and sometimes IV bifurcate, then furrows and ridge evanescent posteriorly. Apterous forms of both sexes unknown.

Male: Sparsely scattered long hairs on underside of abdomen more numerous on VI and VII ventrites; Ventricle VII with a thin row of fine, rather short hairs on each lateral side just beneath the connexivum. Segment VIII beneath strongly impressed on each side of median longitudinal keel, with numerous hairs in each impression. Female with last venter extended a little posteriorly. All tarsi, three-segmented in both sexes, with second segment shortest.

Length, 8.00 mm.; width, 0.85 mm.

Holotype (male) and *allotype* (female), both macropterous, Cucharas, Fuallago, Peru, August, 1954. *Paratypes*: 18 specimens, same labels as type.

Similar in size and general aspect to *B. woythowskii* Hungerford, also from Peru, but readily distinguishable by having the fourth antennal segment very much longer than the second (not much difference in length in *woythowskii*) in both sexes. In the male of *woythowskii*

the two rows of hairs (one on each side) on the lateral sides of tergite VII are extremely long, much longer than in *fuallagana* n. sp. and thus more readily seen. In both species these rows of hairs are placed just beneath the connexiva on the lateral sides of tergite VII. As may be noted in the descriptions of the two species, the male genital characters of the species are quite different.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FIVE NEW BIRDS FROM RIO CHIQUITO, TACHIRA,
VENEZUELA AND TWO EXTENSIONS OF RANGES
FROM COLOMBIA

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

The Hacienda La Providencia, base of operations for this collection, is situated in an extensive subtropical forest at an altitude of 1800 meters in the southwestern corner of the State of Táchira, four miles southeast of the town of Santa Ana (appearing on the 1,000,000 map of the American Geographical Society) and eighteen miles northeast of the Páramo de Tamá. From there a trail was cut to an altitude of 2300 meters.

Besides the new subspecies described, we extend the ranges of one genus and one species from Colombia to Venezuela and discuss the status of three subspecies.

We wish to thank the Curators of the Academy of Natural Sciences, Philadelphia, American Museum of Natural History, Carnegie Museum and Chicago Natural History Museum for access to the collections in these institutions.

Specimens listed are in the Phelps Collection, Caracas, unless otherwise specified. Names of colors are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature," 1912. Wing measurements are of the chord.

Pauxi pauxi pauxi (Linné)

In 1955¹ we identified a specimen from Burgua, southwestern Táchira, as *P. p. gilliardi* (Wetmore and Phelps),² thus extending the range of that subspecies from the Sierra de Perijá, Zulia, to the southern slopes of the Andes in the Orinoco watershed.

Since then, Hermano Nicéfaro María has sent to us for identification 14 casques of the species from Colombia from the region of the headwaters of the Río Sarare³, which flows into the Apure River. These correspond to *P. p. pauxi* and we found our Burgua specimen inseparable from them. Consequently *gilliardi* appears confined to the Perijá Mountains in Zulia and on their western slopes in Colombia.

¹Proc. Biol. Soc. Wash., 68, p. 48, May 20, 1955.

²Journ. Wash. Acad. Sci., 33, No. 5, p. 142, 1943.

³Hermano Nicéfaro María. Una Nueva Crácida para la Avifauna Colombiana, Caldasia, No. 32, pp. 177-184, Sept. 20, 1955.

Porphyryla flavirostris (Gmelin)

Fulica flavirostris Gmelin, Syst. Nat., 1, p. 600, 1789. (Cayenne.)
1 ♂, 3 ♀, Jobure, Terr. Delta Amacuro.

These specimens extend the range of the species to Venezuela from the Guayanas and Brazil. They were collected in February and March, 1950

There is also a specimen, of undetermined sex, in the American Museum of Natural History, from the mouth of the Río Chanaro, Río Caura, Bolívar.

Veniliornis dignus abdominalis, new subspecies

Type: From Río Chiquito, Hda. La. Providencia, Táchira, Venezuela; 1800 meters. No. 61123, Phelps Collection, Caracas. Adult male collected January 27, 1955, by Ramón Urbano. (Type on deposit at American Museum of Natural History.)

Diagnosis: Nearest to *V. d. baezae* Chapman, of Ecuador, but differs from both *baezae* and *V. d. dignus* (Selater and Salvin) of southern Colombia by paler abdomen, more lemon tint, less yellowish; differs from *dignus* additionally by less prominent barring on upper tail-coverts, wider and darker barring on breast, these bars being brighter and more sharply defined; differs additionally from *baezae* by longer bill.

Range: Known only by two specimens, 1 ♂ and 1 ♀, from southwestern Táchira in forests in the Subtropical Zone at 1800 meters.

Description of Type: Top of head and nape Spectrum Red merging into the Scarlet-Red of sides of neck; back olivaceous, more yellowish on rump, with blotches of red, thickest anteriorly; upper tail-coverts olivaceous with feathers tipped with olivaceous buff except posterior ones which are tipped with reddish; post-ocular white superciliary stripe extending to neck; forehead grayish except the very center; lores and malar stripe whitish; auricular region dusky olivaceous; Chin dusky with fine greenish white markings posteriorly; posterior abdomen immaculate Naples Yellow; under tail-coverts yellowish white barred with dusky. Remiges Bone Brown; outer webs of outermost two primaries brownish; rest of remiges and upper wing-coverts more golden than Buckthorn Brown; median coverts with two rows of buffy white shaft streaks and some reddish tips to the feathers; under wing-coverts olivaceous and pale yellowish towards bend of wing, the rest, and axillaries, Maiz Yellow. Tail Bone Brown; outermost rectrices lacking, the following ones and the outer webs of the next ones barred with pale buffy olive.

Bill (in life) "black"; feet "olivaceous"; iris "reddish chestnut." Wing, 98 mm.; tail, 56; exposed culmen, 20.5; culmen from base, 22; tarsus, 18.

Remarks: Sexes unlike in color. Size similar to *dignus*. Range of measurements: one adult male (type)—wing, 98 mm.; tail, 56; culmen from base, 22; one adult female—wing, 99; tail, 63; culmen from base, 21. Measurements of *dignus*: three adult males—wing, 94-95 (94.7); tail, 55-57 (56); culmen from base, 21.5-22.5 (22); one adult female—wing, 97; tail, 56; culmen from base, 21. Measurements of *baezae*: two adult males—wing, 97-100 (98.3); tail, 53-55 (54);

culmen from base, 20; three adult females—wing, 94-100 (98.3); tail, 53-57 (54.7); culmen from base, 19-20 (19.3).

The bill of *baezae* is shorter than that of *dignus* and *abdominalis*, without overlap.

A pair of outer rectrices is missing on both of our specimens.

The female differs in having the top of head dusky brown instead of red and the under parts paler yellow.

These specimens extend the range of the species from Caldas, Colombia, more than 400 kilometers away.

Specimens Examined

V. d. abdominalis.—VENEZUELA: Río Chiquito, Hda. La Providencia, Táchira, 1 ♂ (type), 1 ♀.

V. d. dignus. COLOMBIA: Cerro Munchique, Cauca, 1 ♂⁴, 1 ♂⁵, 2 ♀⁴; San Antonio, 1 ♂⁴; Espinal, Valle, 1 ♂⁵; Bitaco, 1 ♀⁶; Laguneta, Caldas⁵, 3 ♂, 1 ♀; La Leonera, 1 ♀⁶; Sancudo, 1 ♂⁶; Buena Vista, Huila, 1 ♂⁵; La Candela, 1 ♂⁵; Mayasquer, Nariño, 1 ♂⁵; Ricaurte, 1 ♂⁵; Guayacán, 1 ♂⁵; "Colombia," 1 ♂⁷; El Roble, Quindío Andes, 1 ♂⁴; Cordillera Pax⁵, 1 ♂, 2 ♀; Río Churu Yacu, 1 ♀⁵.

V. d. baezae.—EDUADOR:⁴ Baeza, 1 ♂, 3 ♀; Macas region, 1 ♂.

Campylorhamphus pusillus tachirensis, new subspecies

Type: From Río Chiquito, Hda. La Providencia, Estado Táchira, Venezuela; 1800 meters. No. 61154, Phelps Collection, Caracas. Adult male collected January 28, 1955, by Ramón Urbano. (Type on deposit at American Museum of Natural History.)

Diagnosis: Nearest to *C. p. pusillus* (Selater) from Colombia and Ecuador but differs from all races of *C. pusillus* by being more olivaceous, less brownish, especially on under parts.

Range: Known from the Sierra de Perijá on the extreme north-western boundary with Colombia and in southwestern Táchira, in the Subtropical Zone at altitudes from 1800 to 2175 meters.

Description of Type: Crown duskier than Raw Umber, browner on nape and sides of head; feathers of crown, nape and sides of head with Ochraceous Buff, tear shaped, shaft markings; back Argus Brown, the feathers with fine long buffy whitish shaft stripes; rump and upper tail-coverts nearest to Burnt Sienna; chin pale buffy, a broad median streak dull brownish; rest of under parts Snuff Brown; elongated pale buffy shaft spots on throat merging into long thin shaft stripes on breast, sides and flanks which become more indistinct on abdomen; posterior abdomen, thighs and under tail-coverts immaculate. Wings russet; margins of more outer primaries grayish; inner webs of primaries, apically, dusky; lesser upper wing-coverts with very faint buffy shaft lines; under surface of remiges pinkish salmon; under wing-coverts and axillaries Apricot Buff. Tail Auburn, paler on under surface; shafts of rectrices dark brown on upper surface, buffy brown on lower.

⁴Specimens in American Museum of Natural History.

⁵Specimens Academy of Natural Sciences, Philadelphia.

⁶Specimens Carnegie Museum.

⁷Specimens Chicago Natural History Museum.

Bill (in life) "blackish brown"; feet "olivaceous"; iris, "brown." Wing, 97 mm.; tail, 95; exposed culmen, 52, culmen from base, 55; tarsus, 22.

Remarks: Sexes alike. Size similar to *C. p. pusillus*. Range of measurements: two adult males (inc. type)—wing, 95-97 mm.; tail, 94-95; culmen from base (1), 55; four adult females—wing, 95.5-99 (97.6); tail, 88-92 (90.2); culmen from base (2), 52-57 (54.5); Measurements of *C. p. pusillus*: four adult males—wing, 99-103 (101); tail, 92-96 (93.2); culmen from base, 53-56 (54.5); three adult females—wing, 90-101 (95.3); tail (2), 86-95 (90.5); culmen from base, 54-57 (56).

A juvenal specimen with short (black) bill and tail, and all rectrices and remiges with extensive sheaths is similar to adults but is more olivaceous in color with lighter colored wings and tail and uropygium less extensively rufous.

These specimens extend the range of the species from Cundinamarca, Colombia, distant more than 400 kilometers.

Specimens Examined

*C. p. borealis*⁴.—COSTA RICA: Aquinares, 1 ♂, 1 ♀; Binis, 1 (♀); La Estrella de Cartago, 1 ♀; El Pozo, 1 ♂; Bonilla, 3 ♂, 1 ♀; Cariblanco de Sarapiquí, 1 ♀; Agabar de Cartago, 1 ♀. PANAMÁ: Boquete, Chiriquí, 1 ♂; Bogave, 1 ♀; Chiriquí, 2 (♀).

C. p. olivaceus.—PANAMÁ: Río Calovevora, 1 ♀⁴.

C. p. tachirensis.—VENEZUELA: Cerro Pejochaina, Río Negro, Perijá, 1 ♀, 1 (♀); between Ríos Macoíta and Apón, Perijá, 1 (♀); Río Chiquito, Hda. La Providencia, Táchira, 2 ♂ (inc. type), 3 ♀, 2 (♀) juv.

*C. p. pusillus*⁴.—COLOMBIA: San Antonio, Cauca, 1 ♂; Silencio, 1 ♂; east of Palmira, 1 ♂, 1 ♀; Fusagasuga, Cundinamarca, 1 (♀); "Bogotá" 4; Barbacoas, Nariño, 1 ♂. ECUADOR: Sumaco Abajo, 4 ♂, 1 ♀; Ventana, 1 ♀; Baeza, 1 ♂.

Premnornis guttuligera venezuelana, new subspecies

Type: From Río Chiquito, Hda. La Providencia, Táchira, Venezuela; 1800 meters. No. 61172, Phelps Collection, Caracas. Adult male collected February 11, 1955, by Ramón Urbano. (Type on deposit at American Museum of Natural History.)

Diagnosis: Similar to *P. g. guttuligera* (Selater) of southern Colombia, Ecuador and Perú but crown darker, more olivaceous, less brownish with blacker squamulations; back more olivaceous with less rufous tint.

Range: Known from southwestern Táchira and the Sierra de Perijá, northwestern Zulia, in forests of the Subtropical Zone at altitudes from 1800 to 2300 meters.

Description of Type: Forehead light buffy, the feathers margined with dusky, this merging into the Citrine of crown and nape, these feathers margined with dusky giving a squamulated appearance; back Medal Bronze, more Dresden Brown on rump and merging into the Sanford's Brown of upper tail-coverts; upper back with pale buffy shaft streaks, finer ones posteriorly; a post-ocular pale buffy streak; sides of head pale buffy streaked with dusky. Chin buffy whitish, the

feathers very slightly margined with dusky; throat more buffy with indistinct dusky squamulations; breast, sides, and upper abdomen dusky olivaceous with large elongated pale buffy spots; lower abdomen more olivaceous with the shaft streaks narrower and less prominent; flanks and thighs immaculate; under tail-coverts buffy brown faintly barred with dusky. Wings Fuscous; outer vanes of remiges pale brownish, more chestnut on tertials; inner vanes margined with light Ochraceous-Salmon, basally only on primaries, the other ones extensively; primary upper wing-coverts Fuscous; greater and median coverts edged with Medal Bronze and tipped with buffy; lesser coverts Medal Bronze; under wing-coverts and axillaries Pale Orange Yellow. Tail Auburn, paler on under surface.

Bill (in life) "maxilla black, mandible flesh color"; feet "brown"; iris "chestnut brown." Wing, 66 mm.; tail, 69; exposed culmen, 13.5; culmen from base, 16; tarsus, 20.

Remarks: Sexes alike in color, the males with slightly longer wings and tail. Size similar to *P. g. guttuligera*. Range of measurements: five adult males, including type—wing, 66-68 (67.3) mm.; tail, 67-70 (69); culmen from base, 16-17.5 (16.9); five adult females—wing, 63-65 (64); tail (4), 64-66 (65); culmen from base, 16-17 (16.3). Measurements of *P. g. guttuligera*: four adult males—wing, 67-73 (69.2); tail, 65-72 (68.7); culmen from base, 16-17 (16.5); two adult females—wing, 62; tail, 61; culmen from base, 15-16 (15.5).

A juvenal specimen differs from the adults in much heavier streaking on upper back; the rump in prominently blotched with pale brown instead of immaculate; the markings on under parts are darker buff and the lower abdomen is more heavily marked.

These specimens extend the range of the species from Cundinamarca, Colombia, distant more than 400 kilometers.

Specimens Examined

P. g. venezuelana.—VENEZUELA: Río Chiquito, Hda. La Providencia, Táchira, 14 ♂ (inc. type), 2 ♂ juv., 10 ♀, 3 (?). 2 (?) juv.; Cerro Pejochaina, Sierra de Perijá, Zulia, 1 ♂; between ríos Macoita and Apón, Sierra de Perijá, 1 ♀.

*P. g. guttuligera*⁴.—COLOMBIA: Sabía, Cundinamarca, 1 ♂; Coachi, 1 (?); Aguadita, 1 ♂; El Bardío, 2 (?); Cunday, 1 (?); Anolaima, 1 ♂; "Bogotá," 2 (?); La Palma, Huila, 1 ♂; San Antonio, Cauca, 1 ♂ juv., 2 ♀. ECUADOR: Pappacta, 1 ♂, 1 ♂ juv., 1 ♀; Sumaco Abajo, 2 ♂, 2 ♀, 1 ♀ juv.; Baeza, 1 ♂ juv., 2 ♀; Sabanilla, 1 (?) juv. PERÚ: Idma, 1 ♂; Chaupe, 1 ♂, 1 ♀; Chelpea, 1 ♀; La Legia, 1 ♂.

Syndactyla subalaris olivacea, new subspecies

Type from Río Chiquito, Hda. La Providencia, Táchira, Venezuela; 1900 meters. No. 61179, Phelps Collection. Adult male collected February 7, 1955, by Ramón Urbano. (Type on deposit at American Museum of Natural History.)

Diagnosis: Nearest to *S. s. striolata* (Todd) but differs from all races of *S. subalaris* by more olivaceous, less brownish, under parts; from *striolata*, of the States of Lara and Barinas and from eastern

Colombia, differs additionally by darker, more blackish brown, mantle and darker brown top of head.

Range: Known from southwestern Táchira, in the Subtropical Zone at altitudes from 1150 (Cerro El Teteo) to 1900 (Río Chiquito) meters.

Description of Type: Top of head darker than Raw Umber, the feathers with pale buffy fine shaft streaks, broader on forehead; nape and upper back Blackish Brown, the feathers with prominent long whitish shaft streaks; lower back Prout's Brown with fine whitish shaft lines; lower rump and upper tail-coverts darker than Burnt Sienna; lores grayish; sides of head and neck dusky olivaceous spotted and streaked with pale buffy. Chin immaculate Naples Yellow; rest of under parts Medal Bronze the throat, breast and sides and upper abdomen broadly streaked with buffy white; lower abdomen and flanks more finely lined; under tail-coverts Medal Bronze streaked with pale buffy, the apical part of more central coverts largely rufous. Remiges Bone Brown, the outer webs and all of inner tertials Prout's Brown; inner webs of remiges Salmon Buff, basally only on more outermost; upper wing-coverts Prout's Brown, primary ones tipped with dusky forming a patch; lesser coverts with some fine buffy shaft lines and some dusky areas along shafts; under wing-coverts and axillaries Ochraceous-Salmon. Tail Chestnut, paler on under surface.

Bill (in life) "black, greenish gray base"; feet "olivaceous"; iris "dark." Wing, 86 mm.; tail, 80; exposed culmen, 18; culmen from base, 21; tarsus, 21.

Remarks: Size similar to *striolata*. Range of measurements: four adult males, including type—wing 86-91 (88) mm.; tail (2), 80-83 (81.5); culmen from base, 20-22 (21). Measurements of *striolata*: two adult males—wing, 84-88 (86); tail, 80, culmen from base, 20; five adult females—wing, 79-90 (84); tail, 75-82 (79.6); culmen from base, 20-21 (20.4).

Description of juvenal. Ours have a smaller bill; the light markings on upper parts are more ochraceous and the uropygium is olivaceous brown instead of rufous; the light marking on under parts are heavily washed with ochraceous especially the breast and throat; and the chin is speckled with dusky instead of immaculate.

Specimens Examined

*S. s. lineata*⁴.—COSTA RICA: 25. PANAMÁ: Boquete, Chiriquí, 3 ♂; Volcán, 2 ♂; "Chiriquí," 2.

*S. s. subalaris*⁴.—COLOMBIA: Antioquia, 1 ♂; Salencio, Cauca, 1 ♂; La Gallera, 1 (♀); Lomitas 2 (♀); San Antonio, 1 (♀); Cerro Munchique, 1 (♀); Río Cauca, 1 ♀; Jiménez, 1 ♂. ECUADOR: western Ecuador, 15.

S. s. striolata.—VENEZUELA: Anzoátegui, Lara, 1 ♀ (type)⁶: Altamira, Barinas, 1 ♀; COLOMBIA: La Palmita, Santander⁶, 1 ♂, 1 ♀; Cachiri, 1 ♂⁶; Buena Vista, Cundinamarca, 1 ♀⁴; La Candela, Huila, 2 ♀⁴.

S. s. olivacea.—VENEZUELA: Río Chiquito, Hda. La Providencia, Táchira, 5 ♂ (inc. type), 2 ♀, 1 ♂ juv., 1 (♀) juv; Cerro El Teteo, Burgua, 1 ♂.

S. s. mentalis.—ECUADOR: east Ecuador, 6⁴.

S. s. calligata.—PERÚ: Chaupe, 2 ♀⁴.

Grallaricula cucullata venezuelana, new subspecies

Type: From Río Chiquito, Hda. La Providencia, Táchira, Venezuela; 1800 meters. No. 61222, Phelps Collection, Caracas. Adult male collected February 2, 1955, by Ramón Urbano. (On deposit at American Museum of Natural History.)

Diagnosis: Similar to *G. c. cucullata* (Scalater) from the Central and Western Andes of Colombia and from the "Bogotá" region, but differs in having a strong olivaceous wash across breast instead of grayish brown; lower abdomen and lower tail-coverts pale yellowish instead of whitish.

Range: Known from two specimens from the type locality in southwestern Táchira, in the forest of the Subtropical Zone at 1800 meters.

Description of Type: Top of head and lores Amber Brown with olivaceous tint towards nape; sides of head Sudan Brown; nape narrowly olivaceous; back and rump yellower than Saccardo's Olive; upper tail-coverts tinted with Dresden Brown. Throat Ochraceous-Tawny; a white patch between throat and breast; breast Buffy Citrine merging into the grayish olive of sides and flanks; abdomen whitish, slightly creamish posteriorly; thighs Ochraceous-Tawny; under tail-coverts pale buffy. Wings Bone Brown; outermost primaries margined with grayish; other remiges margined with brownish olive, more rufous on tertials; inner vanes of remiges margined internally with pale Ochraceous-Salmon; wing-coverts lightly margined with brownish olive; bend of wing, under wing-coverts and axillaries mixed Ochraceous-Tawny and dusky. Tail dusky olivaceous, the under surface paler; outer vanes of rectrices Madal Bronze.

Bill (in life) "orange yellow"; feet "greenish"; iris "dark." Wing, 66 mm.; tail, 31 exposed culmen, 13; culmen from base, 17; tarsus, 25.

Remarks: Size similar to *cucullata*. Range of measurements: one adult male (type), as above; one specimen of undetermined sex—wing, 66.5 mm.; tail, 30; culmen from base, 16. Measurements of *cucullata*: two adult males—wing, 67-69 (68); tail, 23-27 (25); culmen from base, 16-16.5 (16.3); one adult female—wing, 67; tail, 29; culmen from base, 15; one specimen of undetermined sex—wing, 69; tail, 28; culmen from base, 15.5.

The specimen of the new race, of undetermined sex, has rusty margins to the upper wing-coverts which might indicate immaturity, although otherwise it is similar to the type. As the species is not known from the eastern Andes of Colombia nearer than "Bogotá," these two specimens represent a considerable extension of range; de Schauensee⁸ says it is a rare species. It is not represented in the collections of the U. S. National Museum, Carnegie Museum or Chicago Museum of Natural History.

Specimens Examined

G. c. venezuelana.—VENEZUELA: Río Chiquito, Hda. La Providencia, southwestern Táchira, 1 ♂ (type), 1 (?).

G. c. cucullata.—COLOMBIA: Riolima, Valle, 1 (?)⁴; La Candela, Huila, 1 ♂⁴, 1 ♀⁴, 1 ♀⁵, 1 juv. (?)⁵; "Bogotá," 1 (?)⁴.

⁸Birds of Colombia, p. 741, 1950.

The status of *Machaeropterus regulus*

Since Phelps, in "Las Aves de Perijá⁹," in 1943, identified six specimens from La Sabana as *M. r. antioquiae* Chapman, additional material has been collected from new localities and these have changed our knowledge of the distribution of the species in Venezuela.

Phelps and Phelps, Jr., in "Lista de las Aves de Venezuela"¹⁰, p. 133, in 1950, reidentified the Perijá specimens as *M. r. striolatus* (Bonaparte) and added to the previously known range the localities of La Fria, northern Táchira, and Barinitas, northern Barinas.

In 1952, we found the Perijá population different from *striolatus* and described it as *zulianus*¹¹.

During 1953 and 1954 twenty two additional specimens were obtained from the Perijá region and six from Cerro El Teteo, Burgua, in southwestern Táchira. This abundant new material shows that the La Fria and Barinitas populations, as well as that from Cerro El Teteo are also *zulianus* and that *striolatus* seems not to be found in Venezuela.

The subspecies *M. r. obscuristriatus* Phelps and Gilliard¹² appears confined to the type locality, El Vigia, Mérida, as no additional specimens have been collected.

The subspecies *aureopectus* is still only known in southern Bolívar and Territorio Amazonas by the seven specimens enumerated in our "Lista de Aves de Venezuela"¹⁰, p. 134.

Creurgops verticalis Selater

Creurgops verticalis Selater, Proc. Zool. Soc. London, 26, p. 73, pl. 132, 1858. (Río Napo, Ecuador.)

3 ♂, 1 ♀, Río Chiquito, Hda. La Providencia, Táchira (southwestern); 1800 meters, in forest of the Subtropical Zone.

These specimens extend the range considerably to Venezuela from Colombia in the Departments of Antioquia, Valle, Tolima and Huila. It is not known from the eastern Andes.

These were compared with nine specimens from those Departments, in the American Museum of Natural History. Two of our specimens were collected in January, 1955, and two in February, 1956. The former ones apparently had not moulted as yet and their upper parts are more grayish, less bluish and below they are paler, more buffy, less brownish than the other ones with fresh plumage.

Atlapetes semirufus albigula Zimmer and Phelps

Atlapetes semirufus albigula Zimmer and Phelps, Am. Mus. Nov., 1312, p. 21, March 12, 1946. (Seboruco, Táchira, Venezuela.)

After the description of the type, we noted this additional constant diagnostic character, valid against all the other subspecies: an inconspicuous dusky ring around the eye, beyond the eyelid, open posteriorly. This shows clearly on the type and on the other two known specimens (paratypes).

⁹Bol. Soc. Ven. Cien. Nat., No. 56, p. 309, Sept., 1943.

¹⁰Bol. Soc. Ven. Cien. Nat., No. 75, March, 1950.

¹¹Proc. Biol. Soc. Wash., 65, p. 91, August 5, 1952.

¹²Am. Mus. Nov., No. 1153, p. 7, Nov. 26, 1941.

These have been compared with 17 *A. s. zimmeri* de Schauensee¹³ (the race of the Mérida region) in our collection as well as with the specimens of the other subspecies in the American Museum of Natural History.

¹³Proc. Acad. Nat. Sci. Phila., 99, p. 123, 1947. (Río Negro, Boyacá, Colombia.)

PROCEEDINGS
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FERESA INTERMEDIA (GRAY) PREOCCUPIED

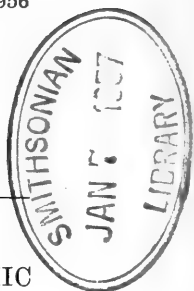
BY J. KNOX JONES, JR. AND ROBERT L. PACKARD
Museum of Natural History, University of Kansas

The specific name *Feresa intermedia* (Gray) was originally proposed as *Delphinus intermedius* Gray (Phil. Mag., ser. 2, 2:376, November, 1827), which is a junior primary homonym of *Delphinus intermedius* Harlan (Jour. Acad. Nat. Sci. Philadelphia, 6:51, June, 1827). To our knowledge, *Feresa intermedia* has no synonyms, either objective or subjective (*Feresa attenuata* Gray, 1875, the only other species of the genus, was considered a synonym of *F. intermedia* by True, Bull. U. S. Nat. Mus., 36:107, 1889; *F. attenuata*, however, is regarded as a distinct species by Yamada, Scientific Repts. Whales Research Inst., 9:59-88, 1954). Therefore, we propose the name *Feresa occulta* for this rare delphinid.

Delphinus intermedius Harlan is currently regarded as a synonym of *Globicephala melaena* (Traill, 1809).
Transmitted May 10, 1956.



PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



THE STATUS, CORRECT NAME, AND GEOGRAPHIC
RANGE OF THE BOREAL CHORUS FROG

BY PHILIP W. SMITH

Illinois Natural History Survey, Urbana

In the late 1940's my wife and I found it necessary to review the relationships of two races of *Pseudacris nigrita* (Le Conte) in the Mississippi Valley in order to allocate properly the populations of chorus frogs occurring in Illinois. In the course of our investigation, we realized that considerable revision of the distributional and morphological concepts of the subspecies *septentrionalis* would be required if it were to be recognized. Consideration of its status was avoided in our study (Smith and Smith, 1952), inasmuch as we were not directly concerned with it in Illinois. The boreal chorus frog was included in a key to the subspecies of *P. nigrita*, however, and its range was vaguely stated as including high elevations in the Rocky Mountains. Although some information regarding the status of the northern race was accumulated during our study of *triseriata* and *feriarum*, we withheld these data in the belief that a monographic treatment of *Pseudacris* was forthcoming by Dr. Charles F. Walker, the foremost student of the genus. Dr. Walker now informs me (pers. comm.) that he has no immediate plans to publish on western chorus frogs, and at the urging of friends I am offering the following notes on the race currently referred to as *P. n. septentrionalis*.

Acknowledgments. I am indebted to Dr. Hobart M. Smith, who was my major professor at the time much of the data presented herein was assembled, and to Drs. H. K. Gloyd, S. A. Minton, and Roger Conant for helpful suggestions and criticisms. I am indebted to Mr. Benjamin Shreve for supplying measurements on cotypes deposited at the Museum of Comparative Zoology and to the following museum officials for their kindness in lending specimens for study: C. M. Bogert, W. J. Breckenridge, G. C. Carl, D. M. Cochran, R. A. Edgren, D. F. Hoffmeister, E. B. S. Logier, J. E. Moore, A. I. Ortenburger, K. P. Schmidt, A. Loveridge, F. A. Shannon, E. H. Taylor, and C. F. Walker.

The sources of material examined are cited by the following abbreviations:

AMNH	American Museum of Natural History.
BC	Provincial Museum of British Columbia.
CNHM	Chicago Natural History Museum.
FAS	Dr. Fred A. Shannon.
INHS	Illinois Natural History Survey.
KU	University of Kansas Museum of Natural History.
MCZ	Museum of Comparative Zoology at Harvard.
OU	University of Oklahoma Museum of Zoology.
RAE	Dr. Richard A. Edgren.
ROM	Royal Ontario Museum of Zoology and Paleontology.
UA	University of Alberta Museum.
UIMNH	University of Illinois Museum of Natural History.
UM	University of Minnesota Museum of Natural History.
UMMZ	University of Michigan Museum of Zoology.
USNM	United States National Museum.

Historical Résumé. Boulenger (1882) described *Chorophilus septentrionalis* from specimens taken at Great Bear Lake, Northwest Territory, Canada, on the basis of the unusually short legs of the northern frogs. Cope (1889), without explanation, placed the name in the synonymy of *Chorophilus triseriatus* (Wied). Dickerson (1906), on the authority of Dr. Stejneger, resurrected *septentrionalis* as a subspecific name for the Canadian race of *Chorophilus nigratus* (Le Conte). Stejneger (Stejneger and Barbour, 1917), however, elevated Boulenger's name to specific status, and Wright and Wright (1933) again reduced it to subspecific rank. Since that time *septentrionalis* has been generally recognized, but its geographic and morphological limits have been but vaguely defined in the herpetological literature. The southern limit of its range has been defined, apparently for purposes of administrative facility, as approximately the International Boundary separating Canada and western United States. Its diagnostic characters, when given at all, have usually had indefinite reference to short leg length. Schmidt (1938), who pointed out a correlation between latitude and leg length of frogs, alluded to *septentrionalis* as "doubtfully distinct."

The status of the boreal chorus frog. The northern race of *P. nigrita* is exceedingly similar to *triseriata*; and, if their slight differences could be demonstrated to be opposite extremes of a regular leg-length cline, relegation of *septentrionalis* to the synonymy of *triseriata* would be the most desirable solution. The evidence available suggests, however, that the two forms are different biological populations, despite the similarity and the wide overlap of diagnostic characters. If the boreal subspecies is taxonomically separable from *triseriata*, its geographic range must be regarded as including northern Minnesota, North Dakota, and all of the Rocky Mountain states (except parts of Arizona and New Mexico) as well as central Canada. The revised concept of its range encompasses the type locality of a nominal, but identical, "species" with an earlier name, *Hyloaes maculatus*, which accordingly becomes the correct name for the boreal chorus frog.

Pseudacris nigrita maculata (Agassiz)

Hylodes maculatus Agassiz, Lake Superior . . ., 1850, p. 378, pl. 6, figs. 1-3 (north shore of Lake Superior; revised to vicinity of Sault Ste. Marie by Schmidt, 1953).

Chorophilus septentrionalis Boulenger, Cat. Batr. Sal. Brit. Mus., 1882, p. 335, pl. 23, fig. 1 (Great Bear Lake, Northwest Territory, Canada).

Chorophilus nigritus septentrionalis, Dickerson, 1906, p. 157.

Pseudacris septentrionalis, Stejneger & Barbour, 1917, p. 31.

Pseudacris nigrita septentrionalis, Wright & Wright, 1933, pp. 92-93.

Hyla canadensis Noble, Amer. Mus. Nov., no. 70, 1923, p. 5 (substitute name for *septentrionalis* which is preoccupied in *Hyla*).

Rediagnosis.—A northern race of *Pseudacris nigrita*, allied and very close to *P. n. triseriata* from which it differs by the proportionately shorter tibia, femur, and foot; relatively shorter and narrower head; proportionately heavier body; and by the higher frequency of specimens with a spotted or mottled pattern.

TABLE 1.—Comparison of diagnostic proportional characters of *P. n. maculata* and *P. n. triseriata*.

	maculata	triseriata*
Number of specimens.....	343	430
Tibia length/body length ratios....	32-46	37-49
Mean \pm 1 S. E.	39.3 \pm .15	42.6 \pm .10
1 Standard Deviation	2.84	2.09
Number of specimens.....	57	---
Head length/body length ratios....	24-34	25-35
Mean \pm 1 S. E.	29.3 \pm .26	30.0
1 Standard Deviation	1.97	---
Number of specimens.....	54	---
Head width/body length ratios....	23-32	25-34
Mean \pm 1 S. E.	27.4 \pm .28	29.0
1 Standard Deviation	2.10	---

*Data from Smith and Smith, 1952.

Types.—Two cotypes, MCZ 38. The two cotypes have tibia/body ratios of 38.5 and 41.6, head length/body length ratios of 30.7 and 29.1, and head width/body length ratios of 23.1 and 25.0. Tibia/body ratios for four near topotypes (AMNH 5127 and three specimens reported by Jacobs, 1950) range from 31.2 to 41.7, averaging 38.5.

Remarks.—The name *septentrionalis* has been used exclusively, although infrequently, for 50 years and accordingly would seem a worthy candidate for the Official List of Conserved Names. However, there are extenuating circumstances in the present case that make strict application of priority the more simple solution. In keeping with a decision of the International Commission at Paris, *Chorophilus septentrionalis* Boulenger, 1882, must be rejected as a secondary junior homonym of *Hyla septentrionalis* Schlegel, 1837 (*vide* Mittleman, 1950) or *Hyla septentrionalis* Duméril and Bibron, 1841 (*vide* Myers, 1950), and *Pseudacris n. canadensis* Noble accepted as the valid name of the boreal

chorus frog since Noble (1923), clearly recognizing the homonymy created by his union of *Pseudacris* and *Hyla*, expressly proposed *canadensis* as a substitute name. It is perhaps fortunate that the name *maculata*, which is earlier than either *septentrionalis* or *canadensis*, is available for the northern race.

Variation.—The provenance of the material studied lends itself to being divided arbitrarily into six samples which may be compared for purposes of discerning geographic variation. Sample A, consisting of *maculata* \times *triseriata* intergrades, includes all specimens from northern Wisconsin, central and southwestern Minnesota, northwestern Iowa, eastern South Dakota, and eastern Nebraska. Sample B, consisting of typical *maculata*, includes all specimens from Ontario, northern Minnesota, North Dakota, and southern Manitoba; sample C, central and northern Manitoba, Alberta, Saskatchewan, British Columbia, and Northwest Territory; sample D, Idaho, Montana and northern Wyoming; sample E, Utah, Colorado, and southern Wyoming; and sample F, consisting of specimens tentatively referred to *triseriata*, includes the few specimens available from Arizona and New Mexico.

TABLE 2.—Geographic variation in six samples of *Pseudacris nigrita* from Canada and western United States.

Sample	Number of specimens	Tibia/body ratios		S.D.	Number of specimens	% specimens striped
		Range	Mean			
A	104	32-46	40.5 \pm .23	2.4	93	95
B	172	32-44	38.7 \pm .22	2.9	93	85
C	69	34-45	38.5 \pm .30	2.5	47	70
D	79	32-46	39.6 \pm .16	1.5	68	44
E	62	36-45	39.6 \pm .24	1.9	49	69
F	33	39-46	42.8 \pm .30	1.7	30	84

The proportionate leg length in sample A is somewhat greater, presumably because of the genetic influence of adjacent populations of *triseriata*, although the mean is actually close to that of *maculata* rather than exactly intermediate between that of *triseriata* and *maculata*. Samples B and C are aligned in an east to west direction. Although these samples are from an area over 1,500 miles in width, relatively little variation in tibial length means is apparent. The frequency of distinctly striped individuals appears to decrease toward the west, but this suggested cline may be fortuitous, particularly since distinguishing a striped from a mottled pattern is quite subjective in many cases. Samples C, D, E, and F are aligned in a north to south direction covering a distance of over 2,000 miles. A comparison of the means of C, D, and E reveals that the leg length gradient predicted by Schmidt (1938) is not apparent, at least intraracially. The somewhat higher means for samples D and E are probably fortuitous, although there is a possibility that a slight correlation may exist between elevation and proportionate leg length. The differences in frequencies of striped individuals in the three samples are probably insignificant.

Sample F from central Arizona and northern New Mexico contains specimens inseparable, from a practical standpoint, from *triseriata* of

the tall grass prairie region, and the few specimens at hand are so assigned, pending the availability of additional series from the critical areas. The specimens I have examined are: *ARIZONA*: UMMZ 79156 (12), 11 mi. S Springerville and UMMZ 99154(2), 17 mi. S Springerville, Apache Co.; USNM 58082, Flagstaff, UMMZ 79153(2), 23 mi. SW Heber, and UMMZ 113848(3), Mormon Lake, Coconino Co.; FAS 1 spec., 8 mi. NNW Lakeside, Navajo Co.; AMNH 772, Fort Verde, Yavapai Co. *NEW MEXICO*: UMMZ 79155(2), David Lee Lake, Catron Co.; and OU 21642-54, Las Vegas, San Miguel Co. It is hoped that this paper will call attention to the problem and that western investigators may clarify the status of the southern populations.

Range.—See fig. 1. In Canada *P. n. maculata* occurs north to the south edge of Great Bear Lake and the southern border of Hudson Bay; east

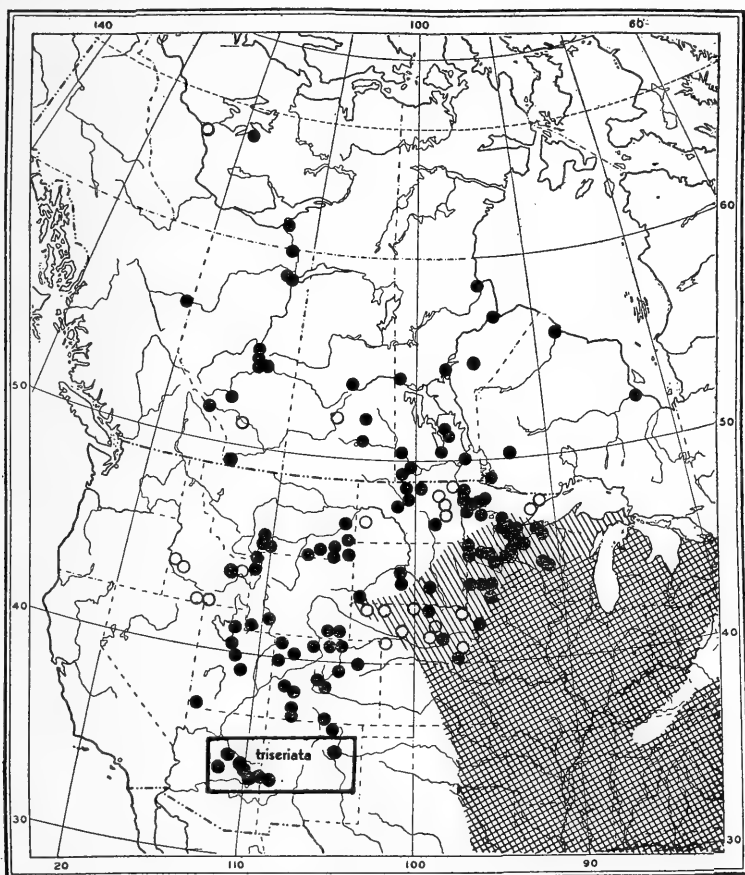


Fig. 1. Distribution of *Pseudacris nigrata* in western North America.

to James Bay; and west to Peace River District, B. C. In the United States it occurs east to northeastern Minnesota; west to the Oregon border; and south through the Rockies to southern Utah and northern New Mexico, south of which it is replaced by a form tentatively regarded as a disjunct western population of *triseriata*. Intergradation of *maculata* and *triseriata* occurs in a rather wide belt extending through northern Wisconsin, central Minnesota, southeastern South Dakota, northwestern Iowa, and most of Nebraska.

Localities from which specimens have been examined are plotted on fig. 1 by solid symbols; published records, by hollow circles. No attempt has been made to locate all published records, but locality records for certain areas on the periphery of the range of *maculata* have been transcribed from the following distributional summaries: Logier and Toner, 1955 (Canada); Tanner, 1941 (Idaho); Hudson, 1942 (Nebraska); and Wheeler, 1947 (North Dakota). The distribution of adjacent subspecies is indicated on fig. 1 by a cross hatch pattern; the area of intergradation of *maculata* and *triseriata* is designated by parallel lines.

In the interest of saving space, two departures from usual practice in citing localities and records have been employed. First, the sources of the specimens examined are indicated only by the initials of the museums, and the exact specimen numbers of the material have been omitted. Second, the localities in the United States are designated only by the names of the counties, and the detailed list of precise localities has been omitted.

Locality records for Pseudacris nigrita maculata (403 specimens examined): **ALBERTA**: Brewster Creek, SW Banff CNHM, UA; 15 mi. NW Chipewyan MCZ; Fort Chipewyan (Logier & Toner, 1955); Edmonton CNHM, MCZ, USNM; 28 mi. N. Edmonton USNM; Ft. Smith AMNH, USNM; High River (Logier & Toner, 1955); Rocky Mountain House CNHM; Spring Creek CNHM; Slave River, Athabaska USNM; 20.8 mi. N Waterton UMMZ. **BRITISH COLUMBIA**: Charlie Lake BC; Tupper Creek, Peace River BC; North Pine River (Logier & Toner, 1955). **COLORADO**: Archuleta Co. USNM; Boulder Co. USNM; Costilla Co. USNM; Delta Co. USNM; Denver Co. USNM; Gunnison Co. OU; Jackson Co. MCZ; Lake Co. USNM; Larimer Co. INHS; Mesa Co. UIMNH; Mineral Co. MCZ; Moffat Co. USNM; Park Co. USNM; Rio Blanco Co. USNM; Routt Co. USNM; Washington Co. USNM; Weld Co. AMNH. **IDAHO**: Ada Co. (Tanner, 1941); Canyon Co. (Tanner, 1941); Cassia Co. (Tanner, 1941); Jefferson Co. UMMZ; Teton Co. (Tanner, 1941); Twin Falls Co. (Tanner, 1941). **MANITOBA**: Bois-sevain AMNH, USNM; Delta CNHM; Ft. Garry, 20 mi. N Winnipeg AMNH; Gypsumville ROM; Horseshoe Lake ROM; Lake St. Martin ROM; Landing Lake near Churchill (Logier & Toner, 1955); Norway House USNM; Oxford House USNM; St. Charles, near Winnipeg ROM; Selkirk Settlement USNM; Shoal Lake USNM; The Pas ROM, UM; Treesbank AMNH; York Factory USNM. **MINNESOTA**: Becker Co. UM; Beltrami Co. UM; Clay Co. UM; Clearwater Co. UM, AMNH, CNHM; Cook Co. (Jacobs, 1950); Lake Co. (Jacobs, 1950); Mahnomen Co. UM; Marshall Co. UM; Polk Co. UM; Traverse Co. UM. **MON-TANA**: Big Horn Co. USNM; Carter Co. USNM; Custer Co. USNM; Dawson Co. USNM; Fallon Co. USNM; Powder River Co. USNM; Rose-

bud Co. USNM; Stillwater Co. USNM; Sweet Grass Co. USNM; Wheatland Co. USNM. *NORTH DAKOTA*: Billings Co. (Wheeler, 1947); Bottineau Co. MCZ; Griggs Co. (Wheeler, 1947); McHenry Co. USNM; Nelson Co. (Wheeler, 1947); Pembina Co. (Wheeler, 1947); Ramsey Co. (Wheeler, 1947); Rolette Co. UM; Stutsman Co. UM; Ward Co. USNM. *NORTHWEST TERRITORY*: Fort Norman (Logier & Toner, 1955); Fort Resolution USNM; Great Bear Lake MCZ. *ONTARIO*: Cochrane District, Ft. Albany ROM; Patricia District, Ft. Severn ROM; Gold-pines, on Lac Seul ROM; Rainy River District, Emo ROM; Lake Superior, north shore AMNH. *SASKATCHEWAN*: Edenwold ROM; Quill Lake CNHM; Saskatoon (Logier & Toner, 1955); Waskesiu Lake ROM. *SOUTH DAKOTA*: Harding Co. USNM; Jones Co. AMNH; Stanley Co. USNM; Washington Co., Battle Creek Canyon CNHM. *UTAH*: Emery Co. INHS; Salt Lake Co. AMNH; Utah Co. UIMNH, USNM; Washington Co. FAS; Weber Co. MCZ. *WYOMING*: Albany Co. USNM, MCZ; Laramie Co. MCZ; Sweetwater Co. AMNH; Teton Co. INHS, USNM; Uinta Co. KU, USNM; Yellowstone National Park AMNH, MCZ, USNM.

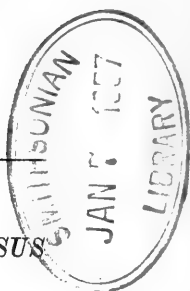
Locality records for Pseudacris n. maculata X triseriata intergrades (125 specimens examined): *IOWA*: Monona Co. AMNH; Palo Alto Co. USNM. *MINNESOTA*: Anoka Co. UM; Carleton Co. UM; Cass Co. UM; Chisago Co. UM; Crow Wing Co. UM; Hennepin Co. Isanti Co. UM; Jackson Co. UM; Kandiyohi Co. UM; Lac Qui Parle Co. UM; Meeker Co. UM; McLeod Co. UM; Mille Laes Co. UM; Pine Co. UM; Ramsey Co. UM; Rock Co. UM; Scott Co. UM; Wadena Co. UM; Washington Co. UM. *NEBRASKA*: Boyd Co. (Hudson, 1942); Cherry Co. (Hudson, 1942); Dakota Co. (Hudson, 1942); Holt Co. CNHM, USNM; Jefferson Co. USNM; Keya Paha Co. (Hudson, 1942); Lancaster Co. (Hudson, 1942); Logan Co. (Hudson, 1942); Merriek Co. USNM; Perkins Co. (Hudson, 1942); Sheridan Co. (Hudson, 1942); Sherman Co. (Hudson, 1942); Wheeler Co. (Hudson, 1942); *NEW MEXICO*: Colfax Co. AMNH. *SOUTH DAKOTA*: Brookings Co. AMNH; Lyman Co. AMNH. *WISCONSIN*: Ashland Co. CNHM; Bayfield Co. RAE; Burnett Co. CNHM; Chippewa Co. AMNH; Clark Co. CNHM.

LITERATURE CITED

- Agassiz, L. 1850. Lake Superior; its physical character, vegetation, and animals compared with those of other and similar regions. Gould, Kendall, and Lincoln, Boston. x + 428 pp.
- Boulenger, G. A. 1882. Catalogue of the batrachia salientia S ecaudata in the collection of the British Museum. London. xvi + 503 pp.
- Cope, E. D. 1889. The batrachia of North America. Bull. U. S. Nat. Mus. 34. 525 pp.
- Dickerson, M. C. 1906. The frog book. Doubleday, Page and Co., New York. xvii + 253 pp.
- Hudson, G. E. 1942. The amphibians and reptiles of Nebraska. Nebr. Conserv. Bull. 24. 146 pp.
- Jacobs, D. 1950. *Pseudacris nigrita triseriata* on the north shore of Lake Superior. Copeia 1950(2):154.
- Logier, E. B. S., and G. C. Toner 1955. Check-list of the amphibians

- and reptiles of Canada and Alaska. Contrib. Royal Ont. Mus. Zool. and Paleont. 41. v + 88 pp.
- Mittleman, M. B. 1950. Status of the name *Hyla septentrionalis*. Herpetologica 6(2):24-26.
- Myers, G. S. 1950. The systematic status of *Hyla septentrionalis*, the large tree frog of the Florida Keys, the Bahamas and Cuba. Copeia 1950(3):203-214.
- Noble, G. K. 1923. The generic and genetic relations of *Pseudacris*, the swamp tree frog. Amer. Mus. Novit. 70. 6 pp.
- Schmidt, K. P. 1938. A geographic variation gradient in frogs. Zool. Series Field Mus. Hist. 20(29):377-382.
- Series, P. W., and D. M. Smith. 1952. The relationships of the chorus frogs, *Pseudacris nigrita feriarum* and *Pseudacris n. triseriata*. Amer. Midl. Nat. 48(1):165-180.
- Stejneger, L., and T. Barbour 1917. A check list of North American amphibians and reptiles. Harvard Univ. Press, Cambridge. i + 120 pp.
- Tanner, W. W. 1941. The reptiles and amphibians of Idaho, No. 1. Great Basin Nat. 2(2):87-97.
- Wheeler, G. C. 1947. The amphibians and reptiles of North Dakota. Amer. Midl. Nat. 38(1): 162-190.
- Wright, A. H., and A. A. Wright 1933. Handbook of frogs and toads. Comstock Publ. Co., Ithaca. xi + 231 pp.

PROCEEDINGS
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NOTES ON THE AMPHIPODS *EURYTHENES*
GRYLLUS (LICHTENSTEIN) AND *KATIUS OBESUS*
CHEVREUX

BY CLARENCE R. SHOEMAKER

There has been considerable confusion as to the status of these two amphipods. Because both sexes of these amphipods had not been identified, and many of the characters of the two genera being similar, it was thought that *Eurythenes gryllus* (Lichtenstein) was the female and *Katius obesus* Chevreux the male of the same species, *Eurythenes gryllus*. Now that both sexes of these two amphipods have been identified they are definitely established as distinct species.

Dr. K. H. Barnard (Discovery Report, Vol. 5, 1932, pp 55-59) has drawn attention to the close similarity of the genera *Eurythenes* (Lichtenstein) 1822 and *Katius Chevreux* 1905. After a careful comparison of the characters of these genera he seemed to think that *Katius* was probably a synonym of *Eurythenes*. He, however, still kept the genera separate, as he records *Katius obesus* on page 56 of the same report.

Dr. K. Stephensen in his Godthaab Expedition Report (Meddelelser om Grønland, Vol. 79, No. 7, 1933, pp. 12-20) discusses these genera and species at some length and in his summary says "*Katius obesus* Chevreux 1905 represents the male and the younger specimens of *Eurythenes gryllus* (*Gammarus gryllus* Lichtenstein, Mandt 1822) of which only the females are known." Why he came to that conclusion it is difficult to understand, as his fig. 6, p. 16, of the same work is plainly of a female *Katius obesus* showing well-developed marsupial plates on the second, third and fifth pereopods.

Many of the specimens of these two species have been in very poor condition, having been found in the stomachs of sharks and other marine animals, thus making it impossible to determine the sex. All the specimens of *Eurythenes gryllus* heretofore taken were, or were thought to be females. The fisheries steamer "Albatross" at station 3342 (52° 39' 30" N., 132° 38' 00" W.) took three specimens of *Eurythenes gryllus* in a large beam trawl at 1,588 fathoms, September 3, 1890. These specimens are in excellent condition, one a female measuring 88 mm., another female 74 mm., and the third, a male, 75 mm. This male, the first to be determined, possesses well-developed sexual organs, so that there can be no doubt of its sex. The discovery of this male establishes *Eurythenes gryllus* as a definite species.)

Besides these three specimens there are in the U. S. National Museum a large female measuring about 95 mm. taken by the steamer "Albatross" at station 2097, off Chesapeake Bay in 1883, at 1,917 fathoms, and a female 73 mm. in length taken at Tromso, Norway.

Katius obesus was described by Ed Chevreux (Bull. Musée Océanographique de Monaco, No. 35, May 5, 1905, pp. 1-5, figs. 1-3) from a small immature specimen 12 mm. in length of unknown sex, taken in the vicinity of the Azores ($36^{\circ} 17' N. 28^{\circ} 53' W.$). In 1932 K. H. Barnard in his Discovery Report, P. 56, recorded from the South Atlantic off South Africa a female 42 mm. in length and a male 25 mm., thus establishing *Katius obesus* as a definite species. A number of specimens of *Katius obesus* were taken by the Danish Oceanographical Exped. 1908-1910 (Vol. 11, D. I, 1915, p. 37) and identified by Dr. Stephensen without giving the sex, and in 1925 he identified several specimens of *obesus* taken by the Danish Ingolf-Exped. (Vol. 3, p. 126) but did not give the sex.

As noted above, Dr. Stephensen in his Godthaab Report, p. 16, figured a female of *Katius obesus* taken by the Danish Ingolf-Expedition. Now that both sexes of *Eurythenes gryllus* and *Katius obesus* have been identified, they should be recognized as distinct species and placed in the genus *Eurythenes*. *Eurythenes gryllus* is the larger species, reaching a length of 100 mm., while the largest specimen of *Eurythenes obesus* so far observed measured 42 mm. These two species appear from some of their anatomical structures to lead very different modes of existence. *Eurythenes gryllus* with its normal peraeopods and weak dactyls would appear to lead a very normal life, perhaps among protecting surroundings, while *Eurythenes obesus* with its robust peraeopods and very strong curved dactyls would appear to be a predaceous or parasitic animal. Barnard thought that it was probably predaceous on quickly moving animals rather than semiparasitic, because the mouth parts show no trace of degeneration as they do in *Chevreuxiella* Stephensen. Dr. Stephensen (Danish Oceanog. Exped., Vol. 3, D.1, p. 37) records a specimen of *Eurythenes obesus* which had bored its way into the remains of a salpa.

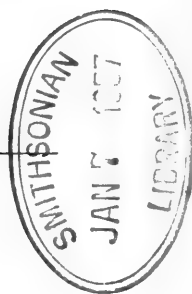
The following specimens of *E. obesus* are in the U. S. National Museum: a female 26 mm. in length with marsupial plates taken at "Albatross" station 2571, off Cape Cod, Massachusetts at 1,356 fathoms; one (sex undetermined) measuring 23 mm. taken by the "Oregon" at station 841 in the northern part of the Gulf of Mexico in 830-930 fathoms; and five much smaller specimens taken at Tromso, Norway.

Eurythenes gryllus was recorded by John Murdoch in 1885, from several specimens taken by the International Polar Expedition to Point Barrow, Alaska, 1881-1883. These specimens have been examined and found to be *Anonyx nugax* (Phipps).

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW GERBILS FROM LIBYA

BY H. W. SETZER
United States National Museum



The new gerbils described below were obtained as the result of field work sponsored by the Office of Naval Research on contract Nonr 1808(00) and are now part of the collections of the United States National Museum.

All measurements are in millimeters and capitalized color terms are from Ridgway "Color Standards and Color Nomenclature" 1912.

Gerbillus pyramidum aureus subsp. nov.

Type.—Adult male, skin and skull, U. S. National Museum no. 302078, from 12 km. W Zliten, Tripolitania Province, Libya. Obtained 22 October 1955 by H. W. Setzer, original no. 2624.

Specimens examined.—Fourteen, from: 12 km. W Zliten, Tripolitania, 13; 5 km. W El Agheila, Cyrenaica, 1.

Diagnosis.—Upper parts near Sayal Brown, purest on sides, flanks and cheeks. Mystacial area, supraorbital, postorbital and postauricular spots, lips, entire underparts, and dorsal surfaces of hands and feet, pure white. Tail obscurely bicolored; dorsal color of tail same as color of back. Tail with black pencil for about distal one-fifth. Dorsal color of back extends on antero-external portion of pinna; postero-external portion of pinna brownish. Skull small, upper toothrow relatively long, auditory bullae relatively large; anterior palatine foramina long, rostrum narrow.

Measurements.—The averages and extremes of eight males and five females from the type locality, with the measurements of the type in brackets, are respectively: Total length 237.4 (229-249), 224.0 (221-230), [249]; length of tail 132.8 (127-144), 125.6 (124-129), [144]; length of hind foot 30.6 (30-31), 30.4 (30-31), [31]; length of ear from notch 14.9 (13-18), 13.4 (13-14), [15]; occipitonasal length of skull 30.5 (29.9-31.6), 29.5 (29.2-29.9), [30.4]; length of auditory bullae 10.9 (10.7-11.2), 10.9 (10.7-11.1), [10.7]; crown length of upper toothrow 4.1 (4.0-4.3), 4.1 (3.8-4.2), [4.1]; greatest breadth across zygomatic arches 16.0 (15.7-16.6), 15.9 (15.7-16.1), [15.9]; least interorbital breadth 5.8 (5.5-6.1), 5.7 (5.6-5.8), [6.1]; breadth of rostrum at level of antorbital foramen 3.2 (3.1-3.3), 3.05 (3.0-3.1), [3.2]; greatest length of nasals 11.9 (11.5-12.1), 10.9 (10.6-11.6), [12.1].

Comparisons.—In comparison with *Gerbillus pyramidum pyramidum* as known from the Nile Valley, Egypt, *G. p. aureus* differs in darker ears, and the black pencil on the distal one-fifth of the tail. In size,

aureus is somewhat smaller, especially the length of the hind foot. The skull of *aureus*, in animals of comparable age, is smaller, more rounded dorsally, narrower across the rostrum, anterior palatine foramina relatively as well as actually longer, auditory bullae relatively larger, pterygoid fossae smaller, palate narrower, and upper cheekteeth relatively larger.

From *Gerbillus pyramidum tarabuli* as known from Sebha, Fezzan Province, Libya, *G. p. aureus* differs in somewhat darker color and somewhat smaller size in all external measurements. The skull is smaller in all respects, especially in breadth and length; the upper tooththrows are parallel instead of divergent anteriorly; auditory bullae relatively larger, and the posterior extension of the bony palate is markedly less.

Remarks.—This new subspecies of gerbil appears to be most closely allied to *G. p. tarabuli* but differs conspicuously in the darker dorsal color and in the darker colored ears.

The type series was taken in a consolidated sandy area along a large wadi. The vegetative cover was predominantly castor beans of which some were found stored in two burrows excavated. No other seeds or plant remains were found stored in the burrows.

***Gerbillus pyramidum favillus* subsp. nov.**

Type.—Adult male, skin and skull, U. S. National Museum no. 302088, from 2 km. E Sirte, Tripolitania Province, Libya. Obtained 24 October 1955 by H. W. Setzer, original no. 2637.

Specimens examined.—Twenty, from: 2 km E. Sirte, Tripolitania, 12; 5 km. E Sirte, Tripolitania, 8.

Diagnosis.—Upper parts near Pinkish Cinnamon, purest on sides, flanks, and cheeks. Mystacial area, supraorbital and postauricular spots, entire underparts (including underside of tail), and dorsal surfaces of hands and feet, pure white. Dorsal surface of tail somewhat lighter in color than back; tail tufted with brownish hairs for about distal one-fifth. Antero-external half of ear same color as back; postero-external surface nearly naked and pale in color. Skull medium in size, dorsal surface relatively flat, rostrum narrow, upper cheekteeth relatively large, auditory bullae relatively large, pterygoid fossae small and roofed over with bone, anterior palatine foramina long and relatively wide, zygomatic arches bowed medially at middle.

Measurements.—Averages and extremes for seven males and thirteen females from the above localities, with the measurements of the type in brackets are respectively: Total length 226.1 (216-240), 220.1 (210-236), [240]; length of tail 125.7 (119-135), 119.3 (110-132), [135]; length of hind foot 30.4 (30-31), 30.3 (30-31), [31]; length of ear from notch 14.4 (13-15), 13.6 (13-15), [15]; occipitonasal length of skull 29.7 (29.3-30.5), 29.4 (28.4-30.1), [30.5]; length of auditory bullae 10.5 (10.3-10.8), 10.5 (10.3-10.9), [10.8]; crown length of upper tooththrow 4.14 (4.1-4.2), 4.2 (4.0-4.3), [4.1]; greatest breadth across zygomatic arches 15.5 (15.1-16.6), 15.7 (15.2-16.3), [16.6]; least interorbital breadth 5.8 (5.5-6.0), 6.0 (5.7-6.2), [5.9]; breadth of rostrum at level of antorbital foramen 3.2 (3.0-3.3), 3.2 (3.1-3.4), [3.3]; greatest length of nasals 11.4 (11.0-12.0), 11.3 (10.4-13.1), [12.0].

Comparisons.—From *Gerbillus pyramidum pyramidum*, *G. p. favillus*

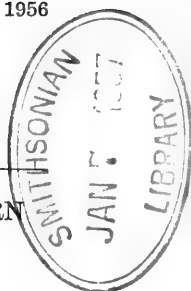
differs in lighter color, shorter tail and shorter hind foot. The skull, in animals of comparable age, is smaller, the upper tooththrows are slightly bowed laterally rather than parallel, the auditory bullae are less inflated, the pterygoid fossae are smaller, the zygomatic arches are bowed medially at the middle rather than straight or slightly bowed laterally, and the dorsal surface of the skull is flatter.

G. p. favillus differs from *Gerbillus pyramidum tarabuli* in somewhat paler color, smaller body size, shorter tail and shorter hind foot. The skull is smaller, the dorsal surface is flatter, the rostrum is narrower, the zygomatic arches bow medially at the middle, the auditory bullae are smaller, the pterygoid fossae are smaller, the upper tooththrows are slightly bowed laterally rather than divergent anteriorly, and the upper cheek-teeth are relatively larger.

Compared with *Gerbillus pyramidum aureus*, *G. p. favillus* is markedly lighter in color and has a brownish rather than black brush on the tail. In size the two subspecies are comparable. The skulls are of about the same size, but in *favillus* the upper tooththrows are bowed laterally instead of straight, the auditory bullae are less inflated ventrally, the zygomatic arches are bowed medially in the middle rather than straight or slightly bowed laterally, and the dorsal surface of the skull is markedly flatter.

Remarks.—This gerbil was taken in loose coastal dunes where the vegetation had been heavily eaten by domestic animals. It seems that gerbils belonging to the species *pyramidum* are different on the different types of substrate one encounters in Libya. The animals here referred to *tarabuli* came from areas resembling hardpan while animals referred to *aureus* came from rather consolidated sand areas which were heavily vegetated. There is, however, still too little data available from which to draw conclusions in regard to habitat preference of the various subspecies found in Libya.

PROCEEDINGS
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A NEW POCKET MOUSE FROM SOUTHEASTERN
UTAH

BY STEPHEN D. DURRANT AND M. RAYMOND LEE

For several years we have been collecting specimens of pocket mice *Perognathus parvus* (Peale) from many localities in southeastern Utah, west of the Colorado River. When Durrant prepared his "Mammals of Utah, Taxonomy and Distribution," he listed (University of Kansas Publications, Museum of Natural History, 6:244, August 10, 1952) only three specimens of this species from this entire area. Furthermore, he stated (*op. cit.*:243), that owing to the paucity of specimens from this area, he was tentatively referring these three specimens to the subspecies *Perognathus parvus olivaceus*. In addition, he stated that additional specimens from this area might prove the existence there of an unnamed subspecies of pocket mice of the species *Perognathus parvus*. The specimens available from this area are now adequate to partially resolve this problem, and do substantiate the aforementioned suspicion of Durrant.

For the loan of comparative materials, we are indebted to Doctor John W. Aldrich and Miss Viola S. Schantz, United States National Museum, United States Fish and Wildlife Service, Washington, D. C., and Doctor Seth B. Benson, Museum of Vertebrate Zoology, University of California, Berkeley, California. We are further indebted to Doctor Seth B. Benson for his aid and advice in this study and also for studying these specimens.

Unless otherwise stated, all measurements are in millimeters. All capitalized color terms are after Ridgway (Color Standards and Color Nomenclature, Washington, D. C., 1912).

This study was financed by a grant from the National Science Foundation.

Perognathus parvus bullatus new subspecies

Type.—Male, adult, skin and skull, number 8771, Museum of Zoology, University of Utah, Salt Lake City, Utah; Ekker's Ranch, Robbers Roost, 25 miles [airline] east of Hanksville, 6,000 feet, Wayne County, Utah; May 18, 1951; collected by John Bushman; original number, 54.
Range.—Insofar as known, that area in southeastern Utah bounded by the San Rafael, Green, Colorado and Fremont rivers.

Diagnosis.—*Size*: Small (see measurements). *Color*: Upper parts and dorsal surface of tail, Light Pinkish Cinnamon or Light Ochraceous Buff, moderately overlaid with black-tipped hairs; cheeks, sides, flanks and circumorbital area pure Light Pinkish Cinnamon or Light Ochraceous Buff; postauricular patches whitish; arietiform markings but slightly darker than surrounding pelage; underparts, feet and ventral surface of tail, white. *Skull*: Short; mastoidal region markedly inflated; mastoidal bullae actually as well as relatively extremely enlarged; auditory bullae large; interparietal small, especially in width; line of union between supraoccipital and mastoidal bullae straight (usually irregular in other subspecies); mastoidal bullae project markedly posteriorly beyond occiput; nasals markedly short; width-across maxillary plates of zygomata decidedly narrow relative to mastoidal breadth; infra-orbital foramina small with long axis directed anterodorsad-posteroventrally; incisors weak and strongly recurved.

Measurements.—Average and extreme measurements of 14 adult male and 5 adult female topotypes are, respectively, as follows: Total length, 161.8 (175.0-151.0), 157.8 (175.0-148.0); length of tail, 86.3 (95.0-77.0), 84.8 (94.0-74.0); length of hind foot, 20.7 (23.0-17.0), 20.3 (22.0-17.0). *Skull*: Average and extreme cranial measurements of 8 adult male and 5 adult female topotypes are, respectively, as follows: Greatest length, 26.0 (26.5-25.4), 24.9 (25.6-24.4); occipitonasal length, 25.6 (25.9-25.1), 24.7 (25.1-24.3); length of nasals, 9.2 (10.0-9.0), 9.0 (9.1-8.8); zygomatic breadth, 11.9 (12.1-11.6), 11.7 (11.9-11.4); mastoidal breadth, 13.6 (13.9-13.2), 13.1 (13.5-12.7); least interorbital breadth, 5.9 (6.0-5.7), 5.8 (6.1-5.6); width of interparietal, 4.0 (4.3-3.5), 4.1 (4.4-3.9); length of interparietal, 3.1 (3.5-2.8), 3.1 (3.4-2.6); width of auditory bulla (from median line to external auditory meatus), 7.2 (7.5-6.9), 7.0 (7.2-6.8); length of mastoidal bullae, 9.9 (10.1-9.7), 9.4 (9.7-9.2); depth of braincase over bullae, 9.1 (9.2-9.0), 9.0 (9.2-8.7); alveolar length of upper molariform tooth-row 3.7 (3.9-3.5), 3.5 (3.7-3.4).

Comparisons.—We examined topotypes and other specimens belonging to each of the three subspecies *Perognathus parvus olivaceus*, *Perognathus parvus clarus* and *Perognathus parvus trumbullensis*. All specimens assigned to *Perognathus parvus bullatus* can be readily distinguished from members of the three aforementioned subspecies by: Nasals shorter; interparietal markedly narrower; auditory and mastoidal bullae actually as well as relatively decidedly larger; ratio of width of anterior part of zygomata to mastoidal breadth 0.88 as opposed to 1.0; bullar index (length of mastoidal bulla X mastoid breadth minus width of interparietal divided by 10), statistically significantly larger.

In addition to the above salient characters, topotypes of *P. p. bullatus* differ from near topotypes of *P. p. olivaceus* as follows: *Size*: Total length less; tail longer relative to total length; hind foot averages smaller. *Color*: Redder, less blackish in upper parts. *Skull*: Mastoidal bullae project caudad of occiput as opposed to non projecting; interparietal shorter.

In a similar manner, topotypes of *P. p. bullatus* are further unlike those of *P. p. clarus* in: *Color*: Redder, upper parts rosaceous as opposed to grayish. *Skull*: Width of auditory bullae greater; depth of combined bullae greater; width across external auditory meatuses greater.

Although markedly distinctive, topotypes of *P. p. bullatus* resemble those of *P. p. trumbullensis* more closely than those of any other subspecies, but differ from them in addition to the above mentioned characters as follows: *Size*: Total length less; hind feet shorter; ears smaller. *Color*: Markedly lighter; lateral line less distinctive; underparts white as opposed to ochraceous buff in most specimens; hairs of venter white basally as opposed to plumbeous in some specimens. *Skull*: Shorter; depth of bullae greater; mastoidal bullae project farther caudad beyond occiput.

Remarks.—We have studied the pocket mice (*Perognathus parvus*) from this entire area of eastern Utah for the past six years, and have series of specimens from numerous localities. The specimens from each locality are quite uniform in their characters, but a wide range of variation exists between series from different localities. This makes for an exceedingly complex situation. We are, at present, in the process of preparing a larger paper on the whole complex of these animals from this general region. To date, we have considerable information on amounts of variation, types of intergradation and rates of subspeciation.

Members of the subspecies *P. p. bullatus* are one hundred per cent diagnostic in their characters. This is not a case of applying any percentage rule in setting off a population as a subspecies, because all members of all ages studied are readily recognizable and easily differentiated. This is the most diagnostic and clearly discernable population known to us within the entire species *P. parvus*. We long considered that these animals constituted a new, undescribed species, but our studies, as of now, lead us to conclude that although they do not as yet constitute a new species, they do represent a kind that is well along on its way to becoming a new species. This subspecies while being widely divergent morphologically from all others has not as yet attained complete reproductive isolation. This is indicated in three specimens from Buckhorn Wash on the San Rafael River. These specimens are highly variable, and have much higher coefficients of variation than do animals of other populations within the species. This degree of variation is typical of animals from areas of secondary intergradation. While these three animals are referable to *P. p. bullatus*, the nature and extent of this variation indicates that interbreeding with members of other populations is still occurring, and hence reproductive isolation has not yet been achieved in all members of *P. p. bullatus*.

The known range of the subspecies *P. p. bullatus* is small, and this subspecies would be considered by some to be only a microgeographic race, and therefore, should not merit being given a formal trinomial name. Among others, we have long championed the point of view that the size of the range should be no criterion for applying or not applying formal taxonomic designations to populations of animals. We consider that the differences in the animals themselves which bespeak of a different genetic constitution, and the degrees of difference should be the determining factors. We submit that the great differences demonstrated by the members of *P. p. bullatus* are evidences in support of our contention. In answer to our critics, we have before us animals from a small geographic area, that are remarkably constant in their characters, are

highly differentiated from all others within the species, and are on the verge of becoming a new species.

Specimens examined.—Total number, 29, distributed as follows: *Emery County*: 1 mi. S San Rafael River, from Buckhorn Wash, 5,200 ft., 3; Old Woman Wash, 23 mi. N Hanksville, 5,200 ft., 4. *Wayne County*: Type locality, 22.

Contribution from the Department of Zoology, University of Utah, Salt Lake City, Utah.

PROCEEDINGS
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THE STATUS OF MORMOPTERUS PERUANUS J. A.
ALLEN

BY LUIS DE LA TORRE

Museum of Natural History, University of Illinois, Urbana

In 1900, J. A. Allen (Bull. Amer. Mus. Nat. Hist. **13**: 226) reported on a small collection of mammals from the Inca Mines on the Inambari River of southeastern Peru. Two bats in this collection were listed as *Nyctinomus* sp. with a statement that they represented "a species nearly related to *N. brasiliensis* [*Tadarida brasiliensis*] I. Geoffroy." Fourteen years later these specimens became the basis for the name *Mormopterus peruanus* J. A. Allen (Bull. Amer. Mus. Nat. Hist. **33**: 387. 1914).

In examining the type (No. 16075) and the paratype (No. 16074) in the American Museum of Natural History I discovered that they were indistinguishable from specimens of *Tadarida brasiliensis*, with which

1-1-2-3

they agreed in dental formula, ———, shape and size of skull, size of

3-1-2-3

wing, and in coloration. Measurements of the type and paratype of *Mormopterus peruanus*, and of a series of six *Tadarida brasiliensis* from Peru are given in Table 1.

It should not be inferred, however, on the basis of this finding, that *Mormopterus* and *Tadarida* are so closely related that the generic separation of their respective species is an artificial one. The specimens upon which Allen based his *M. peruanus* are clearly *Tadarida*, and why he believed they were of the genus *Mormopterus* I do not know. I have examined the neotropical species *minutus* Miller and *kalinowskii* Thomas which are currently considered of the genus *Mormopterus* and these possess peculiarities in dentition, shape of skull, and structure of the ear which are not shared by neotropical species of *Tadarida*.

At the same time, I do not mean to imply that these peculiarities clearly prove the validity of *Mormopterus*. An evaluation of these differences is not possible unless all the molossid species can be studied in detail and their variation noted. Such an appraisal has not been within the scope of this paper.

I wish to express my appreciation to Harold E. Anthony and Richard G. Van Gelder for their kind hospitality and help during my recent visits to the American Museum of Natural History.

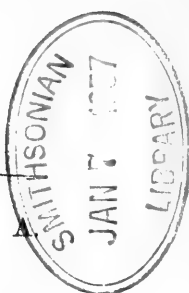
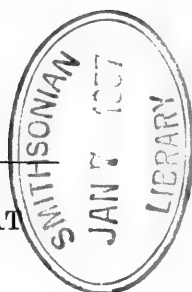


TABLE 1. Measurements (in millimeters) of type (AMNH 16075) and paratype (AMNH 16074) of *Mormopterus peruanus*, and of six specimens (United States National Museum) of *Tadarida brasiliensis* from Peru. The mean is followed by the extremes in parenthesis.

	<i>M. peruanus</i>		<i>T. brasiliensis</i>
	Type	Paratype	6 specimens
Forearm	43.0		43.3 (42.0-44.3)
Metacarpal III	44.5	43.0	43.5 (41.5-44.9)
Metacarpal IV	42.6	41.9	41.9 (39.6-43.3)
Metacarpal V	25.3	26.4	25.7 (24.3-26.6)
Greatest length of skull	17.1	17.6	17.4 (16.8-18.2)
Condylolincisive length	16.1	16.5	16.1 (15.7-16.3)
Zygomatic breadth	9.8	10.2	9.8 (9.6-10.1)
Maximum length of palate	5.8	5.8	5.8 (5.5- 6.0)
Interorbital constriction	4.9	4.9	4.8 (4.6- 5.0)
Postorbital constriction	3.8	3.9	4.0 (3.6- 4.0)
Maxillary tooth row	6.3	6.4	6.4 (6.2- 6.5)
Maximum breadth across molars	7.2	7.3	7.1 (6.9- 7.2)
Maximum length of mandible	11.7	12.1	11.7 (11.2-12.1)
Mandibular tooth row	7.0	7.0	7.0 (6.8- 7.2)

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THE CORRECT TYPE LOCALITY OF THE BAT
TRACHOPS COFFINI

BY LUIS DE LA TORRE

Museum of Natural History, University of Illinois, Urbana

Harry Malleis, incidental to other duties for the U. S. Biological Survey, made an important collection of mammals in 1923 in the central Peten region of Guatemala. Although this collection has never been reported on as a whole, Goldman has described several novelties from it. One of these was the phyllostomid bat *Trachops coffini* (Proc. Biol. Soc. Washington, 38: 23, 1925) described from Guyo, Peten.

During my brief visit to the Peten in 1948, I inquired about Guyo, and was unable to find anyone who knew of such a locality. No map of the region shows a settlement by that name. My suspicion that the spelling was incorrect was increased when a letter to Dr. L. C. Stuart of the University of Michigan brought the following reply: "Malleis had terrible handwriting, absolutely no Spanish at that time, and was down with fever most of the time he was in the Peten. I would suggest that your locality [Guyo] refers either to El Cayo in Br. Honduras to which Malleis paid frequent visits, or El Gallo, a *champo* near the western end of Lake Yaxha, this latter on the El Cayo-Remate trail."

Recently, through the kindness of Viola S. Schantz, U. S. Fish and Wildlife Service, and of John Paradiso, able Aide of the Division of Mammals, U. S. National Museum, I was able to examine the field catalog of Harry Malleis. I find the following entries which are of interest:

July 25. Yaxha

July 26. Guyo

July 27. Remate

A map of this region (Stuart, 1935, Univ. Mich. Mus. Zool. Misc. Publ. No. 29, map following Plate IV) shows a settlement by the name of El Gallo between Yaxha and Remate.

To an English speaking person, with little knowledge of Spanish, "Guyo" would seem to be the correct spelling of the spoken Spanish word Gallo. This leads me to conclude that El Gallo, 8 mi. W. of Yaxha, on the Remate-El Cayo trail, Peten, is the actual type locality of *Trachops coffini* Goldman.

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THE DENTAL FORMULA OF THE BATS OF THE
GENUS *DIAEMUS*

BY LUIS DE LA TORRE

Museum of Natural History, University of Illinois, Urbana

Diaemus is a monotypic genus of vampire bat which in morphological characters is somewhat intermediate between *Diphylla* and *Desmodus*. It is rare in collections and its distribution seems to be restricted to the more tropical regions of South America.

In 1954, specimens of this bat preserved in alcohol were received from Trinidad at the Chicago Natural History Museum. In cleaning the skulls of these specimens I noticed that contrary to the published dental

1-1-1-1

formula of *Diaemus*, ———, (Miller, 1907, U. S. Nat. Mus. Bull. 57:

2-1-2-1

178) two maxillary molars on each side were actually present. Three other specimens in the collection of the above museum were then examined and were also found to possess the additional upper molar. In two of these, however, this tooth was present only on one side. A young adult from Colombia, CNHM 72142, had the tooth on both sides as did the Trinidad specimens.

I have recently examined the only skull of this bat in the United States National Museum, No. 140769, collected in 1901 in Brazil, and undoubtedly the specimen examined by Miller. This individual is old and there are no traces of the second molar.

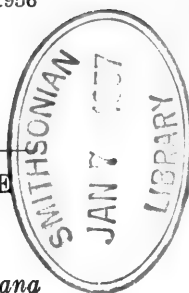
This second upper molar of *Diaemus* is very much reduced in size and structure, being merely a pointed spicule directed anteriorly and found embedded practically horizontally on the maxillary ledge posterior to the first molar. Only in the young adult specimen could this tooth possibly have been functional. In the older individuals the tooth was barely visible above the maxillary bone and was certainly not high enough to have pierced the gum and thus to have been functional. Apparently we are witnessing here the gradual disappearance of this molar from the tooth row of *Diaemus*.

The correct dental formula is:

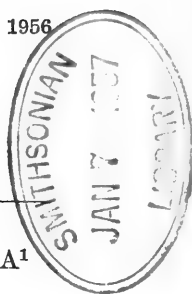
1-1-1-2

2-1-2-1

Diaemus thus becomes the first bat known with 22 teeth.



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THREE NEW GESNERIACEAE FROM PANAMA¹

By C. V. MORTON

The three new species of the plant family Gesneriaceae here described were detected in the course of study of several recent collections that were received from the Missouri Botanical Garden. A complete treatment of the Panama species of this family is being currently undertaken.

***Alloplectus fraternus* Morton, sp. nov. (Subg. *Glossoloma*)**

Herba terrestris, usque ad 15 dm. longa, caubilibus non ramosis (?), tetrabonis, 5-6 mm. diam. (apice 4 mm.) dense hirsutis, pilis flavidis, multicellularibus, patentibus vel deflexis; folia per paria aequalia, longe petiolata, petiolo 5-8 cm. longo, hirsuto, laminis oblongis, 15-16 cm. longis, 7.5-10.5 cm. latis, breviter acuminatis, basi late cuneatis, herbaceis, serrulatis (dentibus utrinque latere 40 vel pluribus apice glandulosis), supra obscure viridibus, strigosis vel appressopilosis, subtus pallidioribus, hirsutis, praecipue in venis, venis lateralibus 7-9-jugis; flores axillares, 1-3, bracteis parvis, persistentibus rubris, ovatis, ca. 9 mm. longis, 4-4.5 mm. latis, acriter acuminatis, minute denticulatis, utrinque hirsutis, pedunculis 1.5-2.5 cm. longis, dense flavido-hirsutis; calyx ruber, 2.5-3.5 cm. longus, lobis liberis, erectis, subaequalibus, orbiculari-ovatis, basi latissimis, 1.8-2 cm. latis, acuminatis, argute serratis (dentibus utrinque latere 20 vel pluribus, deltoideis, usque ad 3 mm. longis, apice glandulosis), utrinque hirsutis, praecipue costam versus; corolla rubra, in calyce obliqua, ca. 5 cm. longa, basi calcarata (6 mm.), tubo ca. 8 mm. diam. supra basin, cylindrico, faucem versus valde ventricosus, 15-17 mm. lato, in fauce non contracto, externe albob piloso, intus glabro, limbo valde obliquo, subregulari, lobis liberis, deflexis, ca. 2.5 mm. longis, 6-8 mm. latis, rotundatis, integris; filamenta basi corolla adnata, in vaginam non connata, glabra, contorta; antherae inclusae, connatae, ca. 1.7 mm. longae, 3 mm. latae, loculis discretis, orbiculatis; ovarium albo-pilosum; stylus glaber; stigma stomatomorphum; disci glandula magna, postica, integra, glabra.

Type in the herbarium of the Missouri Botanical Garden, no. 1,121,467, collected on llanos on the slopes of Volcán de Chiriquí Viejo, Province of Chiriquí, Panama, at an elevation of 1200 meters, April 20, 1935, by Paul H. Allen (No. 1000). A second collection in the U. S. National Herbarium is from Cerro Campana, Province of Panama, alt. 1000 meters, April 21, 1941, *Allen* 2412.

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The nearest relatives of *Alloplectus fraternus* are doubtless *A. panamensis* Morton and *A. simulatus* Morton, which may be separated as follows:

Leaves and stems hirsute.

Calyx lobes oblong, not more than 10 mm. wide, not toothed at base; leaf-blades rounded at base *A. panamensis*

Calyx lobes orbicular-ovate, 1.8-2 cm. wide, toothed throughout; leaf-blades broadly cuneate at base *A. fraternus*

Leaves and stems merely puberulous *A. simulatus*

***Columnea consimilis* Morton, sp. nov. (Subg. *Columnea*)**

Frutex epiphyticus, 50 cm. longus, caulibus pendulis, non ramosis, flavidis, ca. 1.5 mm. diam., setoso-hispidis, pilis rubescentibus, multicellularibus, recte patentibus; folia opposita vel ternata, equalia, breviter petiolata, petiolo 2-2.5 mm. longo, rubro-hispido, laminis teneris, ovato-lanceolatis, 1.6-2.8 cm. longis, 6-12 mm. latis, apice acriter acuminatis, basi subaequalibus et rotundatis, integris, supra viridibus, glabris, subtus pallidioribus, parvissime strigillosis, venis lateralibus 2-jugis, subtus prominulis; flores solitarii (?), pedunculo ca. 1 mm. longo, rubro-setoso; calyx viridis, 2-2.3 cm. longus, lobis ambitu lanceolatis, ca. 8 mm. latis (dentibus inclusis), longe acuminatis, basi latissimus, utrinque incarnato-villosis, laciniatis, dentibus utrinque 3 vel 4, lineari-lanceolatis, usque ad 4.5 mm. longis et 1.5 mm. basi latis, apice glandulosis; corolla coccinea, intus luteo-lineata, ca. 7 cm. longa, tubo supra basin 3.5 mm. diam., sursum gradatim ampliata, non curvato, in fauce 10 mm. lato, externe parce piloso, intus glabro, limbo valde bilabiato, galea 3.3 cm. longa, 2.3 cm. lata, emarginata, lobis lateralibus cum galea longe connatis, basi ca. 15 mm. latis, margine superiore libera 1.6 mm. longa, lobo inferiore deflexo, oblongo, ca. 2 cm. longo, 11 mm. lato; filamenta glabra; antherae exsertae, connatae, oblongae, 3 mm. longae, 1.2 mm. latae; ovarium supra medium pilosum; stylus ubique pilosulus; stigma bilobum; disci glandula postica solum evoluta, glabra, crassa.

Type in the herbarium of the Missouri Botanical Garden, collected in forested slopes of Cerro Tute, near Santa Fé, Province of Veraguas, Panama, on March 25, 1947, at an elevation of 750 meters, by Paul H. Allen (no. 4380).

The only closely allied species is *Columnea arguta* Morton, thus far known only from El Valle de Antón, Province of Coclé, Panama. Both species have similarly red-setose stems, and leaves similar in size and shape. The leaves of *C. consimilis* are thinner in texture and the lateral veins are obvious beneath. Some of them are borne in three's, a character otherwise unknown in the genus. The corolla of *C. consimilis* is a good deal larger in all parts, but has the same shape as that of *C. arguta*, which is somewhat different from that typical of *Eucolumnea*. The calyx lobes are a good deal larger in *C. consimilis*; they are green and have fewer teeth on the sides. The genitalia are similar in the two species.

***Columnea maculata* Morton, sp. nov. (Subg. *Gryptocolumnea*)**

Frutex erectus, caulibus non ramosis, crassis, deorsum 12 mm. diam., sursum 5 mm. diam., hispidis, pilis flavidis, multicellularibus, in apice

tuberculi crassi dispositis; folia per paria valde inaequalia, majora subsessilia, petiolo 1-2 mm. longo, hispido, crasso, laminis coriaceis, anguste oblongis, 19-23 cm. longis, 6-7 cm. latis, acutiusculis, basi obliquis, latere inferiore rotundatis, superiore late cuneatis, margine anguste revolutis, supra viridibus, parce pilosis, subtus pallidioribus, apicem versus rubescentibus, ubique sparse pilosis, venis lateralibus 6 vel 7-jugis, supra obscuris, subtus prominulis; folia minora ignota; flores solitarii (?), ebracteati (?), subsessiles, pedunculo crasso, 1-2 mm. longo, dense hispido; calyx ca. 19 mm. longus, lobis ovato-lanceolatis, 10-12 mm. latis (dentibus inclusis), longe acuminatis, basi latissimis, utrinque dense flavido-hirsutis, laciniatis, dentibus utrinque latere 8-10, lineari-lanceolatis, maximis 4 mm. longis et 1 mm. basi latis, apice glandulosis; corolla lutea, galea intus perspicue purpureo-maculata, lobis alteris late purpureo-lineatis, 7.3 cm. longa, tubo basi perspicue saccato, ca. 4 mm. diam. supra basin, sursum gradatim ampliato, non ventricosso, fauce 7 mm. lato, externe dense albo-piloso, intus glabro, limbo valde bilabiato, galea intus pilosa, 3.2 cm. longa, 1.4 cm. lata, rotundata, lobis lateralibus cum galea longe connatis, margine superiore libera ca. 13 mm. longis, lobo inferiore deflexo, lanceolato, 2 cm. longo, 5 mm. lato, acuminato; filamenta basi glabra, sursum dense pilosula; antherae exsertae, connatae, oblongae, 3 mm. longae, 1.2 mm. latae; staminodium bene evolutum; ovarium sericeum; stylus basi glaber, sursum pilosulum; disci glandula postica solum evoluta, emarginata, glabra, crassa.

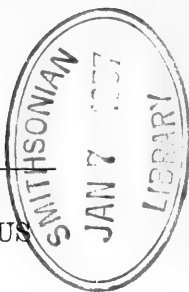
Type in the U. S. National Herbarium, no. 1,823,803, collected in the Fish Creek Mountains, vicinity of Chiriquí Lagoon, Province of Bocas del Toro, Panama, on April 2, 1941, by H. von Wedel (no. 2280). Isotype in the Missouri Botanical Garden.

Related evidently only to *Columnea praetexta* Hanst., a species originally described from an undesignated locality in Costa Rica and still known apparently only from the original collection, which was in the Berlin Herbarium and may now be destroyed. Hanstein's description is fairly complete. These species may be distinguished by the following characters:

Calyx lobes subentire, about $\frac{1}{2}$ as long as corolla; bracts conspicuous (5 cm. long). *C. praetexta*

Calyx lobes deeply laciniate, about $\frac{1}{4}$ as long as corolla; bracts apparently absent. *C. maculata*

PROCEEDINGS
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A NEW SPECIES OF FREE-TAILED BAT (GENUS
MORMOPTERUS) FROM PERU.

BY CHARLES O. HANDLEY, JR.

United States National Museum

The specimens collected by Edmund Heller on the Yale-National Geographic Society Peruvian Expedition in 1915 were reported by Oldfield Thomas (Smithsonian Misc. Coll., 68(4):1-3, 1917 & Proc. U. S. Nat. Mus., 58(2333):217-249, 1920). Because of wartime hazards to trans-Atlantic shipping, Heller's collection was divided so that only a supposedly representative series was sent to Thomas, while the remainder was kept in Washington. Among the specimens not seen by Thomas are two small molossid bats apparently unlike any known species. With allusion to their type locality, the "Lost City" of Machu Picchu, they are here named:

Mormopterus phrudus sp. nov.

Holotype.—U. S. N. M. no. 194449; adult male, skin and skull (digital epiphyses ossified and teeth considerably worn; a portion of the parietal-temporal-pterygoid region and mandible damaged on one side); collected 26 June 1915, by Edmund Heller; San Miguel Bridge, Urubamba River, Machu Picchu, Cuzco, Peru, alt. 6000 feet; collector's number 361.

Distribution.—Known only from the type locality.

Description.—Tooth formula, $1/2 - 1/1 - 2/2 - 3/3 = 30$. Upper incisors weak, strap-like spikes with slight trace of cingulum and no secondary cusp, converging to within 0.4 mm. of each other at tips; P^1 a spicule, 0.1 mm. in diameter and 0.3 mm. high, wedged between canine and P^4 , external to toothrow (only the alveoli of P^1 are preserved in the type, the teeth evidently having been lost in cleaning; in the paratype the tooth is present in one maxilla, but there is no trace even of the alveolus in the other); other teeth much as in *Tadarida brasiliensis*. Facial profile of skull evenly convex; anterior narial opening large, its margins cut down so that in side view it merges evenly with facial profile of skull; rostrum considerably broader than interorbital constriction, and shortened so that anterior opening of infraorbital canal is only about 0.5 mm. from orbit; posterior opening of infraorbital canal situated relatively far (1.5 mm.) back of lachrymal ridge; lachrymal and supra-orbital ridges slightly developed; sagittal and lambdoidal crests low but

distinct; intermaxillary notch about as large as base of canine; palate arched laterally and slightly domed anteroposteriorly; basisphenoid pits scarcely indicated; angular process narrowed at base, rendering posterior border of mandible, between angular and articular processes, concave; mandibular tooththrow crowded; other cranial features as in *Tadarida brasiliensis*.

Lips apparently slightly wrinkled; spoon-hairs numerous on upper lip and side of muzzle; tragus small, narrowed to point at tip; antitragus scarcely indicated; auricles small, thin, rounded at tip, probably not reaching end of snout when laid forward, apparently separated by space of more than 1 mm. on forehead, and apparently lacking horny excrescences on anterior border; gular gland present. Size small; tibia, forearm, and fingers short; other details of muzzle, wings, feet, tail, and membranes as in *Tadarida brasiliensis*.

Mass effect of dorsum somewhat darker than Vandyke Brown, individual hairs becoming whitish toward base; throat whitish; remainder of underparts Bister; auricles and membranes blackish-brown (capitalized color terms from Ridgway, *Color standards and color nomenclature*, 1912).

Measurements.—Collector's measurements (in mm.) of type and paratype (in parentheses): Head and body 50 (51), tail vertebrae 29 (32), hind foot 8 (8), ear from notch 13 (14). For other external and cranial measurements, see tables I and II.

Comparisons.—Peruvian specimens of *Tadarida brasiliensis* I. Geoffroy Saint-Hilaire (and "*Mormopterus peruanus*" J. A. Allen—see de la Torre, Proc. Biol. Soc. Washington, vol. 69, 1956, p. 187) resemble *M. phrudus* in coloration and many other details, but differ from it in the following respects: Three incisors in mandible; P^1 more robust; facial profile of skull concave; anterior narial opening smaller, its margins produced in such a way that in side view it appears to be sharply depressed from facial profile of skull; rostrum longer—anterior opening of infraorbital canal about 1.0 mm. from orbit; posterior opening of infraorbital canal situated relatively short distance (1.0 mm.) back of lachrymal ridge; palate arched, but not domed; basisphenoid pits distinct; angular process broad at base, rendering posterior border of mandible, between angular and articular processes, almost straight; lips thick and wrinkled; spoon-hairs numerous on chin as well as on lips and muzzle; tragus obtuse; antitragus well defined; auricles thick and large, arising from same point on forehead, provided with numerous horny excrescences on anterior borders, and not rounded or pointed at tips; all external dimensions considerably larger and all cranial measurements averaging larger; white throat patch lacking.

The only other species requiring comparison here is *Mormopterus kalinowskii* Thomas. It closely resembles *M. phrudus* in the appearance of the auricle and its appendages and in other important details, but differs from *phrudus* as follows: P^1 absent; entire dorsal profile of skull flat, because of shallow braincase; anterior narial opening smaller, its margins produced in such a way that in side view it appears to be sharply depressed from the facial profile of the skull; palate domed; basisphenoid pits absent; spoon-hairs few, restricted to side of muzzle; external dimensions average larger, but cranial measurements smaller; coloration

tion of fur and membranes very much paler—dorsum “pale fawn-grey,” wing membranes edged posteriorly with white.

Remarks.—Association of the generic name *Mormopterus* with Neotropical species is questionable. The teeth P^1 and I_1 , used by various authors to differentiate *Mormopterus*, are evanescent in the group that includes *Chaerephon*, *Mops*, *Mormopterus*, *Otomops*, *Platymops*, and *Tadarida* and are thus of limited taxonomic value. Apparently the most substantial characters that can be claimed as unique among the species assigned to *Mormopterus* are the size and shape of the auricle. Otherwise they are very much like *Tadarida*. In many respects *M. phrudus* appears to connect the *brasiliensis* section of *Tadarida* with the Neotropical species assigned to *Mormopterus*. However, it is certainly more like the latter.

Speculation on the relationships of the many proposed genera of Molossidae will likely remain relatively fruitless until the whole family is revised. To the present time none of the component “genera” even have been adequately monographed (Sanborn’s review of *Eumops*, Jour. Mamm., 13:347, 1932, is outdated by new material).

I am grateful to John L. Paradiso for pointing out to me the specimens here described, and to Luis de la Torre for notes on “*Mormopterus peruanus*” J. A. Allen.

Specimens examined.—Two, from the type locality.

TABLE I
Measurements of wing, in millimeters, of *Mormopterus phrudus* and related Neotropical species.

	Forearm	III metacarpal	III 1st phalanx	III 2nd phalanx	IV metacarpal	IV 1st phalanx	IV 2nd phalanx	V metacarpal	V 1st phalanx	V 2nd phalanx
<i>Tadarida brasiliensis</i>										
USNM 194440 ♂ Machu Picchu, Peru -----	43.5	43.0	15.7	13.4	40.4	13.0	7.2	25.7	12.9	3.9
USNM 194441 ♂ Machu Picchu, Peru -----	43.3	43.7	16.2	14.6	41.9	13.0	6.7	26.0	12.7	3.7
<i>Mormopterus kalinowskii</i>										
USNM 283175—Trujillo, Peru -----	39.1	38.5	13.6	12.0	37.5	11.5	5.7	24.1	9.9	4.3
USNM 283176—Trujillo, Peru -----	36.9	36.3	12.8	11.4	35.0	11.1	5.4	22.7	9.7	3.8
USNM 103928 ♂ Chosica, Peru -----	34.3	34.9	12.3	10.6	34.2	10.7	5.4	22.6	9.6	3.6
<i>Mormopterus phrudus</i>										
USNM 194449 ♂ Machu Picchu, Peru -----	34.8	34.8	11.2	10.0	33.6	9.5	4.0	21.4	8.2	3.4
USNM 194450 ♂ Machu Picchu, Peru -----	33.8	34.6	11.8	11.1	33.4	10.1	4.8	21.8	8.7	3.6
<i>Mormopterus minutus</i> (Sanborn, Jour. Mamm., 1953:383) CNHM ♂ Omaja, Cuba -----	31.0	31.5	12.5	11.0	30.5	10.2	6.6	20.9	8.8	3.5

TABLE II
Measurements of skull, in millimeters, of *Mormopterus phrudus* and related Neotropical species.

	Greatest length (excluding incisors)	Zygomatic breadth	Interorbital breadth	Braincase breadth (1)	Braincase depth (excluding aud. bull.)	Maxillary tooth row (canine to M ³)	Postpalatal length (2)	Palatal breadth (3)	Mandible (4)	Mandibular tooth row (canine to M ³)
<i>Tadarida brasiliensis</i>										
USNM 194440 ♂ Machu Picchu, Peru	16.7	10.0	4.0	8.3	5.6	6.5	7.0	6.9	11.8	6.9
USNM 194441 ♂ Machu Picchu, Peru	17.3	10.1	4.0	8.6	5.9	6.2	7.1	6.9	—	—
<i>Mormopterus kalinowskii</i>										
USNM 283175—Trujillo, Peru	15.4	---	3.5	7.6	5.1	5.5	6.4	6.4	10.6	5.8
USNM 283176—Trujillo, Peru	15.3	8.7	3.4	7.7	5.0	5.3	6.3	6.1	10.1	5.7
USNM 103928 ♂ Chosica, Peru	14.6	---	3.3	7.3	5.2	5.2	6.3	—	10.3	5.7
<i>Mormopterus phrudus</i>										
USNM 194449 ♂ Machu Picchu, Peru	16.2	---	3.7	7.9	5.6	5.9	6.5	6.7	11.1	6.4
USNM 194450 ♂ Machu Picchu, Peru	---	---	---	---	5.5	5.7	—	6.5	10.9	6.1
<i>Mormopterus minutus</i>										
(Sanborn, Jour. Mamm., 1953:383)										
CNHM ♂ Omaja, Cuba	13.8	---	3.3	6.7	—	5.0	—	5.6	---	—

(1) measured between lateralmost limits of parietals.

(2) anterior limit of mesopterygoid fossa to ventral lip of foramen magnum.

(3) between lateral borders of M³ alveoli.

(4) articular process to anterior extremity, excluding incisors.

PROCEEDINGS
OF THE
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A NEW JIRD FROM LIBYA

By H. W. SETZER

United States National Museum

The new jird described below was obtained as the result of field work sponsored by the Office of Naval Research on contract Nonr 1808(00); the specimens are now part of the collections of the United States National Museum.

All measurements are in millimeters and capitalized color terms are from Ridgway "Color Standards and Color Nomenclature" 1912.

***Meriones shawi azizi* subsp. nov.**

Type.—Adult male, skin and skull, U.S.N.M. 302242 from 5 km. SE Derna, Cyrenaica, Libya. Obtained 9 November 1955 by H. W. Setzer, original no. 2717.

Specimens examined.—Two, both from the type locality.

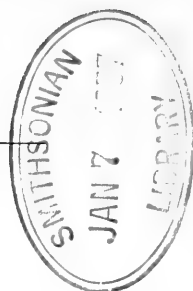
Diagnosis.—General overall dorsal coloration near Buffy Brown gradually shading over the sides and flanks to a line of pure color near Pinkish Cinnamon; entire underparts, dorsal surfaces of hands and feet, and small postauricular spot pure white; tail markedly bicolor, slightly darker than general overall dorsal color and with a black pencil on the dorsal surface for about the distal one-fourth. Skull average for the species; auditory bullae well inflated; zygomatic arches relatively broad; rostrum relatively heavy; interorbitum relatively wide; and braincase relatively well inflated.

Measurements of the type specimen.—Total length 278; length of tail 143; length of hind foot 33; length of ear from notch 19; occipitonasal length of skull 36.4; length of palate 19.2; length of auditory portion of auditory bulla 12.4; crown length of upper toothrow 4.8; least interorbital breadth 6.6; length of nasals 14.0; breadth of rostrum at level of antorbital foramen 4.9; greatest breadth across zygomatic arches 20.9.

Comparisons.—*Meriones shawi azizi* differs from *M. s. shawi*, as known from Gheminez, Libya, in markedly darker dorsal coloration, somewhat longer tail, somewhat shorter hind foot, and a markedly reduced postauricular spot. Skull more rounded dorsally, wider interorbitally, rostrum wider, zygomatic arches wider, auditory bullae shorter and more inflated ventrally, and upper incisors narrower.

Remarks.—This new subspecies needs comparison with no other named subspecies of *shawi* since the only other two kinds are farther removed geographically than is the nominate form.

These animals were apparently not common near Derna. They occurred



in a fallow barley field of dark rocky clay soil. The common animal associated with them was *Gerbillus campestris dodsoni* which we trapped in rather large numbers.

This jird is named for Abdel Aziz Salah in thanks for the many kindnesses shown me in Cairo.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



NEW RACES OF BIRDS FROM LAEM THONG, THE
GOLDEN CHERSONESE

BY H. G. DEIGNAN*

In the course of a general revision of the birds of Thailand in connection with preparation of a regional check-list, the several forms described below have seemed to deserve sub-specific recognition. For the loan of comparative material of one or more species and information on specimens not personally examined, I wish to express my thanks to the authorities of the British Museum (Nat. Hist.), London, the Museum of Comparative Zoölogy, Cambridge, Mass., the American Museum of Natural History, New York, the Chicago Natural History Museum, and the Academy of Natural Sciences of Philadelphia.

FAMILY PSITTACIDAE

Loriculus vernalis phileticus, subsp. nov.

Type.—U. S. Nat. Mus. No. 153682, adult female, collected at Ban Phra Muang [lat. 7°20' N., long. 99°30' E.], Trang Province, Thailand, on 15 March 1896, by William L. Abbott.

Diagnosis.—Nearest *L. v. vernalis* of the Indo-Chinese countries north of the Isthmus of Kra, from which it differs in adult plumage by having the green coloration everywhere decidedly darker and duller (less yellow-green, more grass green).

Range.—The Mergui Archipelago (Sullivan's Island), the southern part of the Mergui District of Tenasserim, and Thailand south of the Isthmus of Kra.

FAMILY CAPITONIDAE

Megalaima incognita elbeli, subsp. nov.

Type.—U. S. Nat. Mus. No. 452629, adult female, collected at Ban Muang Khai [lat. 17°30' N., long. 101°20' E.], Loei Province, Thailand, on 7 January 1955, by Robert E. Elbel (collector's number RE 4399).

Diagnosis.—Nearest *M. i. euroa* of southeastern Thailand (Chanthaburi and Trat Provinces), from which it is separable by having the throat a blue-suffused green or green-suffused blue rather than cerulean blue; the postocular black streak but narrowly and indistinctly bordered above with greenish blue, rather than broadly bordered with rich blue;

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and by having the auriculars anteriorly yellow-green, gradually changing posteriorly to greenish blue, rather than wholly cerulean blue.

Range.—Tongking (Laokay Province); Laos (Chiang Khwang and Saravane Provinces); eastern Thailand (Loei and Nakhon Ratchasima Provinces).

FAMILY MUSCICAPIDAE (TIMALIINAE)

Pellorneum ruficeps elbeli, subsp. nov.

Type.—U. S. Nat. Mus. No. 459792, adult male, collected at Ban Na Muang, near Muang Daen Sai [lat. 17°15' N., long. 101°05' E.], Loei Province, Thailand, on 7 October 1954, by Robert E. Elbel (collector's number RE 4110).

Diagnosis.—As its geographical position implies, this form is intermediate between *P. r. chthonium* of northern Thailand and *P. r. ubonense* of the southeast portion of the eastern plateau, having the upper parts olivaceous brown as in *ubonense* (although averaging rather lighter), and the ground color and degree of streaking of the under parts quite as in *chthonium*.

Range.—The northwestern portion of the eastern Siamese plateau (Loei and Phetchabun Provinces).

Pomatorhinus schisticeps difficilis, subsp. nov.

Type.—U. S. Nat. Mus. No. 336655, adult male, collected on Doi Luang Chiang Dao [lat. 19°25' N., long. 98°55' E.], Chiang Mai Province, Thailand, on 23 November 1936, by H. G. Deignan (collector's number 2010).

Diagnosis.—From *P. sch. ripponi* of the Shan States and northernmost Thailand (Chaiya Prakan and Chiang Rai Provinces), separable in fresh-plumaged adults by longer and more robust bill, by having the general coloration of the upper parts rufescent brown rather than olivaceous brown, and by having the coloration at the sides of the breast and along the flanks chestnut rufous rather than rufescent orange or light rufescent brown.

From fresh-plumaged adult *P. sch. humilis* of the Mae Khong basin and northeastern Thailand (Nan and Loei Provinces), separable by much more massive bill, much more rufescent upper parts, and by having the coloration at the sides of the breast and along the flanks chestnut rufous rather than dull rufescent brown or light grayish brown.

From fresh-plumaged adults of *P. sch. nuchalis* of the Karen Hills, separable by having the crown rufescent brown rather than slaty brown and by having the coloration at the sides of the breast and along the flanks chestnut rufous rather than chestnut.

From fresh-plumaged adults of *P. sch. alivaceus* (synonym: *siamensis* Stuart Baker) of Tenasserim (southward from the Tavoy District) and southwestern Thailand, separable by shorter and less robust bill and by having the coloration at the sides of the breast and along the flanks chestnut rufous rather than dark rufescent brown or deep grayish brown.

Range.—Mountains of northwestern Thailand from Doi Luang Chiang Dao south into the Amherst District of Tenasserim.

Macronus gularis saraburiensis, subsp. nov.

Type.—U. S. Nat. Mus. No. 332019, adult male, collected at Sathani Hin Lap [lat. 14°40' N., long. 101°10' E.], Sara Buri Province, Thailand, on 6 December 1931, by Hugh McC. Smith (collector's number 5200).

Diagnosis.—Belonging to the group of races with finely streaked throat, this form invites comparison only with *lutescens* and *sulphureus* among its neighbors. From the former it differs in having the pileum duller and more nearly chestnut than chestnut-rufous, and the mantle paler and olivaceous brown rather than an oily-tinged brownish olive; from the latter it differs in having both the pileum and the mantle decidedly darker and duller, without any golden suffusion. From both it differs in having the under parts Barium Yellow (Ridgway), rather than Pale Lemon Yellow (Ridgway), washed along the flanks with olivaceous gray rather than olivaceous green.

Range.—The southwestern portion of the eastern plateau of Thailand (Sara Buri, Nakhon Ratchasima, Nakhon Nayok, and Prachin Buri Provinces).

FAMILY MUSCICAPIDAE (SYLVIINAE)

Phylloscopus davisoni intensior, subsp. nov.

Type.—U. S. Nat. Mus. No. 324638, adult male, collected on Khao Knap [lat. 12°25' N., long. 102°50' E.], Trat Province, Thailand, on 26 December 1929, by Hugh McC. Smith (collector's number 3571).

Diagnosis.—Nearest *Ph. d. davisoni* of northern Tenasserim and northwestern Thailand, but differing by having the broad coronal bands black (not blackish olive) and much more clearly defined, the central coronal streak, supercilium, lores, ear coverts, and sides of the throat suffused with a brighter yellow. From *Ph. d. klossi* of southern Annam easily distinguishable by its generally much less rich yellow suffusion, but especially over the under parts (which are no yellower than those of the nominate race).

Range.—Southeastern Thailand (Trat Province) and probably the mountains of adjacent Cambodia.

FAMILY MUSCICAPIDAE (MUSCICAPINAE)

Muscicapa banyumas lekhakuni, subsp. nov.

Type.—U. S. Nat. Mus. 330734, adult male, collected on Khao Laem [lat. 14°25' N., long. 101°30' E.], Nakhon Ratchasima Province, Thailand, on 26 December 1930, by Hugh McC. Smith (collector's number 4416).

Diagnosis.—Nearest *M. b. deignani* of southeastern Thailand (Chanthaburi and Trat Provinces), but differing in the adult male by having the indigo blue of the upper parts slightly deeper and the shining blue of the front and shoulder patch brighter and more extensive; the orange-rufous of the under parts of a deeper tone and not at all pallescent on the throat.

From *M. b. whitei*, which occurs in the northwestern portion of the eastern plateau, separable in the male by its larger bill and much deeper tones of blue above and orange-rufous below, in the female by larger bill, gray-washed crown, and richer orange-rufous under parts.

Range.—The southeastern portion of the eastern plateau of Thailand (Nakhon Ratchasima Province).

***Monarcha azurea gallerita*, subsp. nov.**

Cotypes.—U. S. Nat. Mus. No. 249048, adult male, collected on the islet Ko Kut [lat. $11^{\circ}40'$ N., long. $102^{\circ}35'$ E.], Trat Province, Thailand, on 26 December 1914, by Cecil Boden Kloss; U. S. Nat. Mus. No. 249050, adult female, collected on Ko Kut, on 29 December 1915, by Cecil Boden Kloss.

Diagnosis.—The unworn adult male differs from *M. a. montana* of northern Thailand by having the general coloration Dark Diva Blue (Ridgway) instead of Cadet Blue (Ridgway); from *M. a. prophata* of the Malay Peninsula south of the Isthmus of Kra, by having the pallid area of the posterior under parts of greater extent and more nearly pure white. The unworn adult female differs from that of *prophata* (exactly as does that of *montana*) by having the mantle a paler, more rufescent, brown and the pallid area of the posterior under parts of greater extent and more nearly pure white.

Range.—The coastal regions of the southeastern provinces of Thailand, of the central plains (Bangkok), and of the southwestern provinces (Prachuap Khiri Khan); ?Cochin-China.

Remarks.—It has seemed to me advisable to establish cotypes for the new form, since the males show characters very near those of *prophata*, while the females possess characters equally near those of *montana*. Such ambivalence has, in the past, led to its identification with one or the other race, in accordance with each author's emphasis on the characters of one or the other sex.

FAMILY NECTARINIIDAE

***Arachnothera affinis caena*, subsp. nov.**

Type.—U. S. Nat. Mus. No. 451428, unsexed adult, collected at Ban Hin Laem [lat. $14^{\circ}40'$ N., long. $98^{\circ}40'$ E.], Kanchanaburi Province, Thailand, on 3 November 1952, by H. G. Deignan (collector's number 59).

Diagnosis.—Separable from *A. a. modesta* of the Malay Peninsula southward from the Isthmus of Kra by having the upper parts a lighter and brighter, more golden, olive green, and the under parts with the olivaceous-gray ground color paler and everywhere more strongly washed with pale yellow.

Range.—Central Tenasserim (Amherst and Tavoy Districts) and the evergreen forest of southwestern Thailand (Kanchanaburi and Prachuap Khiri Khan Provinces).

***Arachnothera magna musarum*, subsp. nov.**

Type.—U. S. Nat. Mus. No. 350458, adult male, collected on Doi Phu Kha [lat. $19^{\circ}05'$ N., long. $101^{\circ}05'$ E.], Nan Province, Thailand, on 5 April 1936, by H. G. Deignan (collector's number 1095).

Diagnosis.—Separable from *A. m. magna* of the eastern Himalayas by having the general coloration above decidedly less suffused with golden, and the ground color of the under parts, especially on the abdomen and under tail coverts, only faintly washed with pale yellow.

Range.—The Southern Shan States; northern Tenasserim (Salween District); northern Thailand; northern Laos.

Remarks.—Immature specimens of *musarum* have the under parts as strongly washed with yellow as the adults of the nominate race.

***Arachnothera magna pagodarum*, subsp. nov.**

Type.—U. S. Nat. Mus. No. 451430, adult female, collected at Ban Hin Laem [lat. 14°40' N., long. 98°40' E.], Kanchanaburi Province, Thailand, on 25 November 1952, by H. G. Deignan (collector's number 263).

Diagnosis.—From *A. m. musarum* of northern Thailand separable by having the upper parts still less suffused with golden, thus duller and greener, and the striations, while everywhere equally numerous, less clearly defined; from *A. m. aurata* of Pegu, distinguished by stronger striation above and by having the streaks of the under parts as broad and bold as in *musarum*.

Range.—Lowland evergreen forest of central Tenasserim (Tavoy District) and southwestern Thailand (southern Tak and Kanchanaburi Provinces).

FAMILY DICAIEIDAE

***Dicaeum agile separabile*, subsp. nov.**

Type.—U. S. Nat. Mus. No. 361256, adult male, collected near Dalat [lat. 11°55' N., long. 108°26' E.], Haut-Donai Province, Annam, in October 1939, by Joseph F. C. Rock (collector's number 857).

Diagnosis.—In fresh plumage distinguishable from *D. a. pallescens* of eastern Thailand by having the upper parts a paler olive green, suffused with ashy over the head and anterior mantle, and the ground color of the under parts whiter, less suffused with cream.

Range.—Southern Annam (Haut-Donai and Phanrang Provinces).

FAMILY PLOCEIDAE

***Ploceus philippinus angelorum*, subsp. nov.**

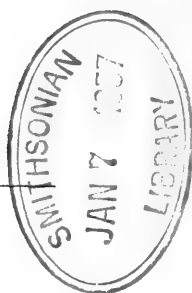
Type.—U. S. Nat. Mus. No. 307353, adult female, collected at Bangkok [lat. 13°45' N., long. 100°30' E.], Thailand, on 8 April 1924, by Hugh McC. Smith.

Diagnosis.—When females in fresh nuptial plumage (March-April in most regions) are compared, this form is separable from *Pl. ph. passerinus* of Nepal (synonym: *burmanicus* Tiechurst) by having the edgings of the feathers of the upper parts a warm Ochraceous-Buff (Ridgway) instead of a colder grayish buff, and from *Pl. ph. infortunatus* of Malaya by having these edgings a warm Ochraceous-Buff (Ridgway) instead of a rich rufescent buff.

Range.—The plains of central Thailand.

Remarks.—Examples of *passerinus* in the juvenal plumage show much the same coloration as adults of *angelorum*.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



TWO NEW THIRIPIDAE (THYSANOPTERA)
FROM BANANA

BY J. DOUGLAS HOOD

The thrips described below were first detected in a vial of specimens taken from banana flowers in February, 1956. Both species are said to be of some economic importance, and names for them have been requested. They are figured in detail in a paper soon to be published in *Revista Brasileira de Entomologia*.

Systemothrips, gen. nov.

(*systemos*, tapering to a point or pointed; *thrips*.)

Body moderately depressed, without heavy sculpture. Head longer than wide, with a broad median lobe on posterior margin, distinctly produced between eyes and antennae, front nearly as broad as first antennal segment. Ocelli anterior in position, the median one in advance of front margin of eyes, the posterior ones close to anterior margin of eyes. Interocellar setae long and strong, arising at sides of ocellar triangle in advance of eyes. Antennae 9-segmented, slender, tapering evenly from V-IX, the last three segments thoroughly distinct from each other and from VI, segment VII slightly narrowed at base; I short and broad (much as in *Chirothrips*); sense-cones simple and slender. Mouth-cone moderately short, broadly rounded apically; maxillary palpi 2-segmented. Prothorax with the usual two pairs of setae at posterior angles. Legs moderately short; fore tibiae with a distinct tooth on inner lower surface near tip; fore femora with a tooth (often minute) on inner lower surface near base, both of these teeth larger in large females and in males. Wings strongly recurved apically, formed almost as in *Organothrips* and with very similar chaetotaxy. Abdominal terga with thin flange along posterior margin; segment IX much the longest, X divided; male with single median glandular areas on sterna II-VII.

Type species: *Systemothrips latens*, sp. nov.

Obviously allied to *Organothrips*, but very different in having 9-segmented antennae, flanged abdominal segments, and in the anterior position of the ocelli.

Systemothrips latens, sp. nov.

Female (macropterous).—Length about 1.2 mm. (fully distended, 1.5 mm.). General color brown; head darkest and blackish brown, thorax palest; antennae dark brown in segments I, II, V, and VI, segments VII-IX successively paler and more yellowish, III dull yellowish in about basal two-thirds and shaded beyond, IV pale brown but paler basally; femora largely brown, fore pair darkest, all more or less yellow at either end; tibiae and tarsi yellow; fore wings gray-brown, darkest at tip and

in basal third beyond base. Head about 190μ long, 160 across eyes, 152 just behind eyes, 161 across cheeks, 140 across base; head process 35μ long in front of eyes, 102 wide near base, 96 apically; front broad, 33μ ; prominent interocellar setae about 60μ long and 47 apart; one pair of strong lateral setae at widest part of cheeks; antennal segments, length (and width): I exposed length 13 (36), II 40 (30), III 54 (20), IV 42 (18), V 26 (18), VI 49 (14), VII 23 (11), VIII 22 (10), IX 36 (8). Prothorax 140μ , width 203, sides and anterior margin nearly straight; fore tibial tooth straight, 14μ . Fore wings with about 19 setae on front margin, 5-7 on fore vein, and about 7 on hind vein. Apical abdominal setae yellow, long and slender, III on IX and X respectively 172μ and 100μ .

Male (brachypterous).—Length about 1.0 mm. (distended, about 1.1 mm.). Color brown, with thorax, legs, and last two abdominal segments brownish yellow, head scarcely darker than dark parts of abdomen. Fore legs swollen in large males, fore tibiae broadened at tip; fore femoral tooth sometimes as long as 24μ , fore tibial tooth equally long but stouter. Wing pads reaching about to middle of first abdominal segment. Abdominal sterna II-VII each with a nearly circular or transversely elliptical glandular area, that on VII largest.

ECUADOR: Quevedo, Feb. 23 and Aug. 2, 1956 (holotype, ♀, on latter date); and Pichilínque Exp. Sta., Aug. 1, 1956 (including allotype, ♂); 17 ♀♀ and 6 ♂♂, taken by Edmundo Ward, Robert T. Smith, and Harold Yust, from bracts of banana flowers and from the pseudostem.

***Palleucothrips*, gen. nov.**
(*palleukos*, all white; *thrips*.)

Body elongate, not depressed, without heavy sculpture. Head wider than long, not produced beyond eyes, front broader than first antennal segment. Eyes very prominent, strongly protruding both laterally and anteriorly, coarsely faceted, narrower than their interval, very sparsely pilose. Ocelli small and very close together, situated behind middle of eyes. One pair of large setae arising at inner edges of eyes just behind posterior ocelli. Antennae 8-segmented, very slender, normal in general structure; sense-cones long and slender, those on segments III and IV forked; setae very fine and inconspicuous. Mouth-cone well rounded at tip, slightly surpassing base of prosternum; maxillary palpi 2-segmented. Prothorax with two pairs of very long setae at posterior angles. Legs long and slender. Wings straight, tapering, very narrow, their setae pointed and very long (those on costal margin about three times as long as width of wing at middle, those on the two principal veins shorter). Abdomen slender; setae on segments IX and X moderately long; male with a pair of strong, approximate, thorn-like setae arising from tubercles behind middle of tergum IX.

Type species: *Palleucothrips musae*, sp. nov.

This genus should apparently be placed near *Corynothrips*, *Coreomothrips*, and *Rhabdothrips*, though at first glance it is suggestive of *Sericothrips* and those other genera whose eyes are prominent, but whose abdomen is clothed with microtrichia, and whose pronotum is usually finely cross-striate. None of these has a pair of large setae near the inner margins of the eyes, though the first three named above do have very narrow wings with large setae.

***Palleucothrips musae*, sp. nov.**

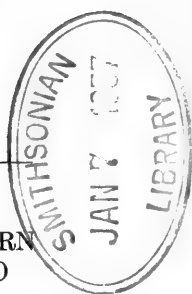
Female (macropterous).—Length about 1.1 mm. (fully distended, about 1.3 mm.). Color of body and appendages clear white excepting for light washes of brown in apical portions of segments III and IV of

antennae and at the bases of the sense-cones and setae on V-VIII; ocellar pigmentation orange. Head about $110\ \mu$ long, 178 across eyes, 141 at anterior end of the concave cheeks, 129 across base; front $34\ \mu$ wide between antennae, the groove itself wide, transverse, and deep, its sides covering about one-half of inner surface of first antennal segment; interocular setae strong, about $65\ \mu$ long and as widely separated as eyes; most of head behind ocelli and eyes delicately reticulo-striate and asperate; eyes very prominent, $60\ \mu$ long, 44 wide and 90 apart, areas between facets nearly black; antennal segments, length (and width): I 19 (27), II 40 (28), III 78 (16), IV 43 (17), V 42 (16), IV 35 (13), VII 17 (8), VIII 40 (6). Prothorax about equal in width ($179\ \mu$) to head across eyes, length $103\ \mu$; pronotum smooth excepting for a few transverse striae near posterior margin; setae colorless, the two pairs near posterior angles long ($92-98\ \mu$) and arising from distinct tubercles. Wings of fore pair about 20 times as long as width at middle, with about 16 setae on costal margin (longest $130\ \mu$), fore vein with $4+1+1$, hind vein with 2 just beyond middle of wing and one at apical fifth. Abdominal setae colorless, II on segment IX $75\ \mu$, I and III somewhat shorter, II on X $51\ \mu$.

Male (macropterous).—Size, color, and general structure as in female; seta I on IX $30-33\ \mu$ long and about $5\ \mu$ broad near base, arising from contiguous rounded tubercles.

ECUADOR: Quevedo, Aug. 2, 1956, Dr. Robert T. Smith, 8 ♀♀ (including holotype) and 2 ♂♂ (including allotype), injuring banana fruit.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



TWO NEW SPECIES OF CINARA FROM NORTHERN
ARIZONA WITH ILLUSTRATIONS OF HITHERTO
UNFIGURED SPECIES AND NOTES
ON SCHIZOLACHNUS FLOCCULOSA (WILLIAMS)
(APHIDAE)

By F. C. HOTTES

The material from which Williams described his *Lachnus flocculosa* has been believed to be lost for many years. The discovery of two of the original slides in the Aphid collection of the United States National Museum makes *Schizolachnus pini-radiatae* (D) a synonym, and enables us to recognize the species described by Williams for the first time.

The two species described as new are from the region of the Grand Canyon, Arizona.

Cinara grande n. sp.

Apterous viviparous female.

Size and general color.—Length from vertex to end of anal plate varying from 4.80-5.10mm. Color in life not recorded. Color of cleared specimens as follows: head and prothorax dark dusky brown the dusky brown extending on to the lateral portions of the meso and metathorax. Spiracles located on abdomen within large patches of dusky brown. Cornicles very dark brown except for the base of the hairs, where the cornicles are light in color. Cauda, anal plate, and genital plate, very dark dusky brown, transverse pigmented spots anterior to cauda similar. Rest of dorsum of abdomen free from pigmented areas, except for pigment associated with wax pore plates, and the very dark pigmented areas associated with the base of the hairs, areas which are not much larger than the diameter of the hairs. First antennal segment concolorous with head, second antennal segment not quite so dark. Third and fourth antennal segments pale, except for apical region which is dusky brown. Fifth and sixth antennal segments with only base pale, remainder dusky brown. Clypeus much darker than head. Coxae almost black. Femora with basal one fourth dusky yellow remainder black, or brownish-black. Tibiae black with a short region of brownish-black on basal half. Prothoracic tibiae with much less brownish black, and sometimes with none. Tarsal segments not quite as dark as apex of tibiae.

Head and thorax.—Length of antennal segments as follows: III .70-.75mm., IV .18-.21mm., V .30-.35mm. VI .20-21+.05-.06mm. Third an-

tennal segment without sensoria, fourth antennal segment with or without one sensorium, fifth antennal segment with primary and one secondary sensorium. Primary sensorium on sixth segment very tuberculate. Marginal sensoria with wide margins, irregular in size, of two types, the larger with an open center, the smaller with only a dot. Hair on antennae numerous, fine, varying in length from .10-.15mm. quite upstanding, but poorly mounted. Long hair on sixth segment not extending beyond middle of segment. Unguis short but nail-like. Hair on vertex and dorsum of head numerous, slightly longer than that on antennae. Rostrum not fully extended, but known to extend beyond metathoracic coxae. Length of pro and metathoracic femora as follows: 1.95, 2.47-2.62mm. Length of first metatarsal segment .12mm. length of second metatarsal segment .42mm. Hair on femora fine, numerous, upstanding. Hair on outer margin of hind tibiae more numerous than hair on inner margin, except at apex of segment where the hair on the inner margin are more numerous than the hair on the outer margin. Hair on outer margin quite upstanding, about .15mm. in length, hair on inner margin not quite so long, and slightly finer. First tarsal segment with about eight hairs on the ventral surface, the dorsal surface of this segment is shorter than the length of the union between this segment and the second. Hairs on the dorsal surface of the second segment fewer than those on the ventral surface and much longer.

Abdomen.—Width of base of cornicles about .38mm. quite regular in outline. Entire surface of cornicle with numerous hairs which are about .10mm. in length, except on the rim where they are much shorter. All hairs on the cornicles arise from clear areas. Hairs on the dorsal and ventral surfaces of the abdomen similar in character and length, numerous on both surfaces, about as long as those on the cornicles. Pigmented areas anterior to cauda with widely spaced hairs, on posterior half. Genital plate crescent-shaped, with the hairs more numerous at the ends. Dorsum of abdomen with a setulose surface arranged in the form of transverse reticulations. This condition is difficult to see, except in regions which are favorable.

Host *Abies concolor*. Taken on the North Rim of the Grand Canyon, Arizona June 7, 1954. Collected by J. W. Bongberg. Holotype apterous viviparous female returned to the collection of The United States National Museum.

This species may be differentiated from *C. sonata* H. and *C. abieticola* (Chol.) by the absence of pigmented spots on the abdomen, by not having coarse and fine hairs on the cornicles, from *sonata* it may be differentiated further by having the base of the cornicles smaller and more regular in outline. From *C. alacra* H & E it differs in having longer tibial hairs, only one kind of hairs on the cornicles, and much more numerous hairs on the antennae, and in the shape of the unguis.

***Cinara poketa* n. sp.**

Apterous viviparous female.

Size and general color.—Length from vertex to end of anal plate 2.60mm. Color in life very dark brownish-black, shining, with neither powder or pruinose covering. First and second antennal segments concolorous with head, remaining antennal segments shading from pale yellowish to dusky brown at the apex. Femora with exception of extreme

base deep brownish-black. Tibiae black with a brownish-black area on basal half. Cornicles two toned dusky brown.

Head and thorax.—Length of antennal segments as follows: III .37mm., IV .15mm., V .19mm., VI .10+.03mm. Third antennal segment with one small sensorium which is rather far removed from end of segment, and may not be a primary sensorium. Fourth antennal segment with primary sensorium very small. Fifth antennal segment with one secondary sensorium and the primary. Antennal hair sparse, upstanding, varying in length from less than one half width of segment to just equal to the width of segment. Hair on dorsum of head and on vertex similar to that on antennae. Transverse suture of head narrow. Rostrum most likely not fully extended, but reaching to end of methathoracic coxae. Last three segments of the rostrum with the following lengths: .17, .16, .08mm. Length of pro meso and metathoracic femora as follows: .075, .66, .775mm. Length of pro meso and metathoracic tibiae as follows: .87, .90, 1.50mm. Length of hind tarsal segments .08 and .24mm. Both anterior and posterior margins of femora with similar hair, which are about as long as the hair on the third antennal segment. Hind tibiae strongly curved. The hind tibiae are provided with comparatively few rather widely spaced hairs, the hairs varying in length from .04 to .05mm. all being shorter than the width of the tibiae, the ratio of hair length to width of tibiae being 3-4 to 5. The hairs on the outer margin of the tibiae are dull at the end, hence the length given may not represent the total length of these hairs. Hair on inner margin of hind tibiae sharp-pointed for the most part, increasing in length near the apex of the tibiae, but still shorter than the width of the tibiae at this point. First tarsal segment with about ten hairs on the ventral surface. *Abdomen*.—Cornicles with base measuring only .20mm. across. Outer rim of cornicles with some clear areas. Total number of hairs on cornicles varying from three to four. Cornicles very shallow. Dorsum of abdomen with comparatively few short rather spine-like hairs. Hairs on ventral surface of abdomen slightly longer than those on the dorsum, much more numerous. Genital plate deeply excavated on posterior margin, hairs on genital plate few and short, confined largely to ends. Pigmented spots anterior to cauda extremely narrow, hardly longer than the four hairs on the posterior margin. Cauda and anal plate provided with long hairs.

Holotype apterous viviparous female. Host, *Pinus edulis* Aug. 24, 1956. Taken at point where road to Anita, Arizona branches from Highway 64 leading to Grand Canyon, Arizona. The specimens of this species feed on the small branches which are free from needles.

In nature this species is suggestive of *C. atra* G & P from which it may be differentiated at once by the more numerous hairs on the dorsum, the more shallow cornicles, the shorter hairs on the ventral surface of the first tarsal segment, and the dull hairs on the outer margin of the tibiae.

Schizolachnus flocculosa (Williams)

Lachnus flocculosa W. 1911.

Schizolachnus pini-radiatae (Davidson) new synonymy. Among unidentified Aphid slides sent me for determination by Miss Louise M. Russell of the United States National Museum were two slides from the

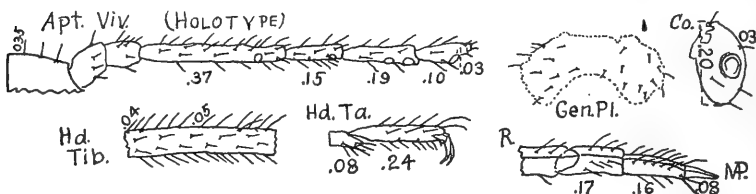
collection of T. W. Williams, whose paper on the Aphididae of Nebraska was published posthumously in 1911. These slides carry the data "On *Pinus ponderosa*, War Bonnet Canyon, 6/23/90. One slide carries the name *Lachnus flocculosus* n. sp. The other slide is indicated by *Schizoneura* sp.? Both slides carry specimens of the species described by Davidson as *Lachnus pini-radiatae*.

The original description of this species published under Williams's name carries the notation that there are no specimens in either the Nebraska or United States National Museum collections. This description also states that alate specimens were not found.

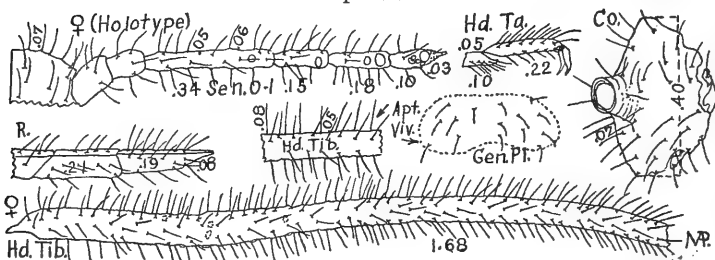
J. J. Davis in his "Williams The Aphididae of Nebraska A Critical Review" states that slides bearing specimens of this species are probably lost.

Both slides in the United States National Museum collection carry the Williams number 75. The slide indicated as *Schizoneura* sp. has an alate viviparous female mounted on it.

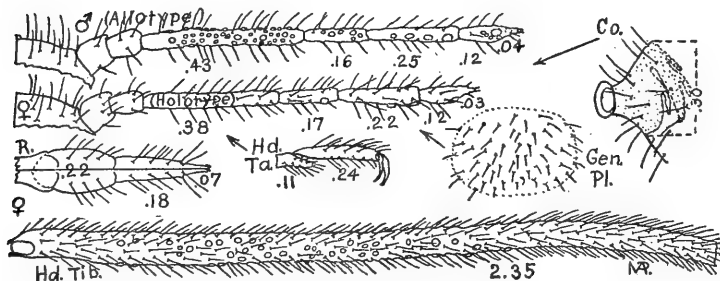
Lectotype, apterous viviparous female, mounted on slide indicated by name *Schizoneura* sp. in the writing of Williams. It will be noted that the species is spelled *flocculosa* in the original description, not as on the slide.



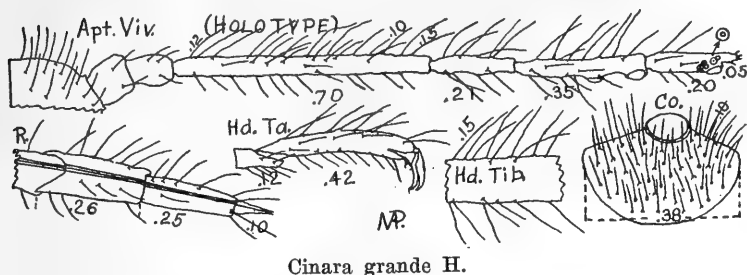
Cinara poketa H.



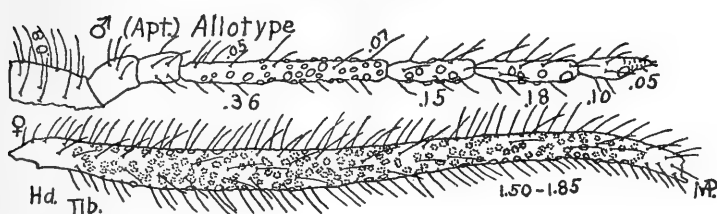
Cinara rustica H.



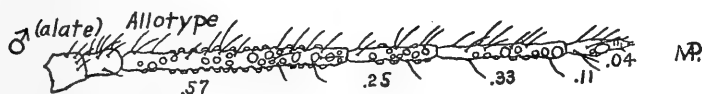
Cinara metalica H.



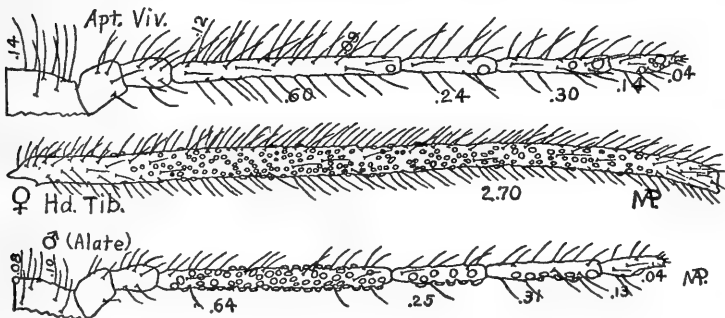
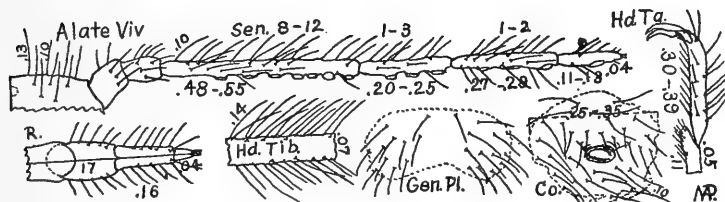
Cinara grande H.



CINARA nitidula H.

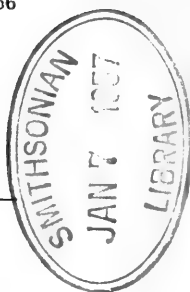


CINARA wahtolca H.



Cinara anzaei H. & E.

PROCEEDINGS
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TWO NEW SPECIES OF CINARA FROM ALASKA
(APHIDAE)

F. C. HOTTES

The two new species of *Cinara* described herewith add to the little known Aphid fauna of Alaska.

Cinara bonita n. sp.

Apterous viviparous female.

Length from vertex to end of abdomen 5.675mm. Color and pulverulence in life not recorded. The head of the specimen from which this species is described is brown, the clypeus is also brown, but much darker than the head. The natural color has been removed from the thorax and abdomen. The coxae are a deep brown. The femora are yellowish-brown except for the extreme base which is yellowish. Tibiae brown, the brown being somewhat darker at the base and much darker towards the apex. Tarsal segments concolorous with apex of tibiae, except for a small amount of black on the first segment. First antennal segment concolorous with head, second and third antennal segments pale dusky, remaining antennal segments slightly darker. All antennal segments quite uniform in color from end to end. Cornicles cauda and anal plate slightly darker than abdomen, which is free from pigmented spots.

Head and thorax.—Vertex and dorsum of head with hairs moderately coarse, sharp-pointed and about .08mm, in length. Median suture of head narrow and dark brown in color. The eyes are small. Ocular tubercles present but small. Rostrum not extended. Last three segments of rostrum with the following lengths: .24, .22 and .01mm. Length of antennal segments as follows: III .54mm., IV .18mm., V .26mm., VI .18+.03mm. Third antennal segment without sensoria, fourth antennal segment with a very small primary sensorium, fifth antennal segment with one very small secondary sensorium, and a moderately tuberculate primary sensorium. Hair on posterior margin of third antennal segment sparse, slightly finer and shorter than elsewhere. The hair on the anterior margin of the third antennal segment varies from .06-.7mm. in length, and is set at an angle of about fortyfive degrees. The fifth and sixth antennal segments are weakly imbricated. Mesosternal tubercle not apparent. All femora with numerous long fine hairs, the hairs varying in length from .07-.10 mm. Length of pro, meso and metathoracic femora 1.08, 1.05 and 1.41mm. Length of pro meso and metathoracic tibiae 1.425, 1.425 and 2.02mm. Hair on outer margin of hind tibiae about .10mm. in length, upstanding, some set at an angle of about

ninety degrees, remaining hair on tibiae less upstanding, finer and slightly shorter. Hair on inner margin of hind tibiae more numerous than hair on outer margin. Ventral surface of first metatarsal segment with about eighteen hairs, this segment is about .14mm. in length. Second metatarsal segment .50mm. in length, hairs on the ventral surface of this segment finer and shorter than those on the dorsal surface. Dorsal and ventral surfaces of abdomen with hairs of about the same length being more or less equal to the length of the hairs on the cornicles. Base of cornicles quite regular in outline, almost round measuring about .22mm. across. The cornicles have about three rows of hairs all of which point away from the rim, all hairs are of about the same length. Wax-pore plates present on the dorsum of abdomen, small, arranged in about six irregular rows.

This species differs from *C. abieticola* (chol.) and *C. sonata* H. in not having pigmented spots on the dorsum of the abdomen, the unguis is not long or thin enough to be nail-like, the cornicles have only one kind of hairs. The pigmented spots anterior to the cauda are lacking. Holotype apterous viviparous female, deposited in the collection of the United States National Museum. Host not recorded, most likely *Picea* either *glauca* or *mariana*. Gulkana River, Alaska. Summer 1955. Coll. G. D. Schumann.

Cinara bonica n. sp.

Apterous viviparous female.

Length from vertex to end of abdomen varying from 3.38-3.60mm. Color in life not recorded, cleared specimens indicate the head as dusky. First two antennal segments concolorous with head, remaining antennal segments pale dusky, quite uniform in color from end to end. Femora dusky brown, much darker at apex. Tibiae dusky brown, slightly darker towards apex. Tarsal segments concolorous with apex of tibiae. Cornicles much darker than abdomen. Abdomen free from pigmented spots on the dorsum, except for waxpore plates and block shaped pigmented areas anterior to cauda.

Head and thorax.—Length of antennal segments as follows: III .40-.45mm., IV .18mm., V .24-.255mm., VI .18-.20+.015mm. Third and fourth antennal segments without sensoria. Fifth antennal segment without or with one secondary sensorium and primary. Primary sensorium on sixth antennal segment slightly tuberculate, marginal sensoria with wide rims. Unguis extremely short, and thick. Hair on antennae moderately abundant, rather upstanding, about .12mm. in length. All antennal segments almost smooth. Hair on head similar to hair on third antennal segment. Transverse median suture narrow and dark. Rostrum not extended, last three segments with the following lengths: .24, .21, and .12mm. Mesosternal tubercle not present. Pro, meso and metathoracic femora with the following lengths: 1.095, 1.125, 1.50mm. Length of pro, meso and metathoracic tibiae as follows: 1.35-1.50, 142-165, 198-226mm. Length of metathoracic tarsal segments .12 and .34mm. All femora with large irregular shaped sensoria. Hair on femora fine, long and numerous. Hair on metathoracic tibiae similar on both outer and inner margins fine, about .15mm. in length. Hairs on outer surface of tibiae more upstanding than those on inner margin. Ventral surface of first tarsal segment with about ten hairs. Hairs on dorsal and ventral

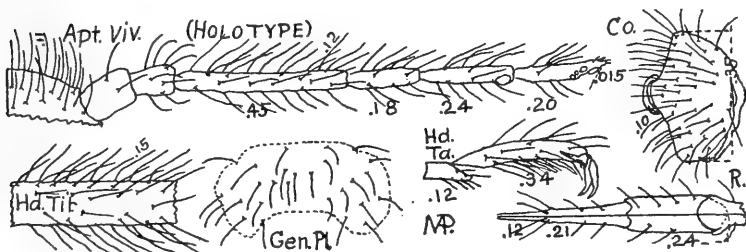
surfaces of second tarsal segment of about the same length, but more numerous on ventral surface.

Abdomen.—Anterior dorsum of abdomen with about two rows of very narrow waxpore plates. Cornicles with outer margin very regular in outline, and varying in width from .33-.355mm. Cornicles with about six rows of hairs, all hairs similar in character but hairs on restricted area shorter. Dorsum of abdomen with setulae very fine and short, arranged in transverse anastomosing rows which give this surface a reticulated appearance. Hair on ventral and dorsal surfaces of abdomen numerous, and similar in character and length. Pigmented areas anterior to cauda with irregular outline, block shaped with hairs few and limited to posterior half.

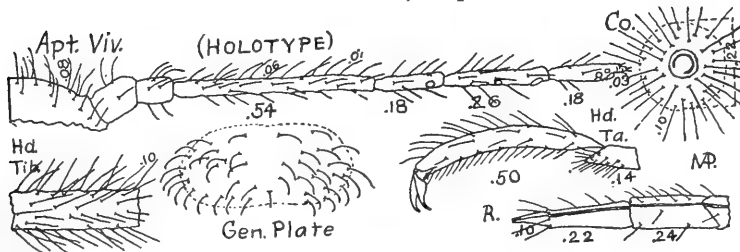
This species appears to be most closely allied to *C. bonita* differing from that species in the shorter second tarsal segments, number of rows of hairs on the cornicles, the presence of pigmented spots anterior to the cauda, longer hairs on the ventral surface of the second tarsal segment, longer tibial hairs, and the shorter unguis.

Host unknown, as it was not recorded. The most likely host is white spruce, *Picea galuca*, there is also the possibility that the host was black spruce, *Picea mariana* which grows in association with the white spruce, along the Gulkana River. Gulkana River, Alaska Summer 1955. Coll. G. O. Schumann.

Holotype deposited in the collection of the United States National Museum. The holotype an apterous viviparous female, is mounted under the same cover slip as the holotype of *Cinara bonita*, both species may have been taken on the same or different hosts.



Cinara Bonica, n. sp.



Cinara Bonita n. sp.

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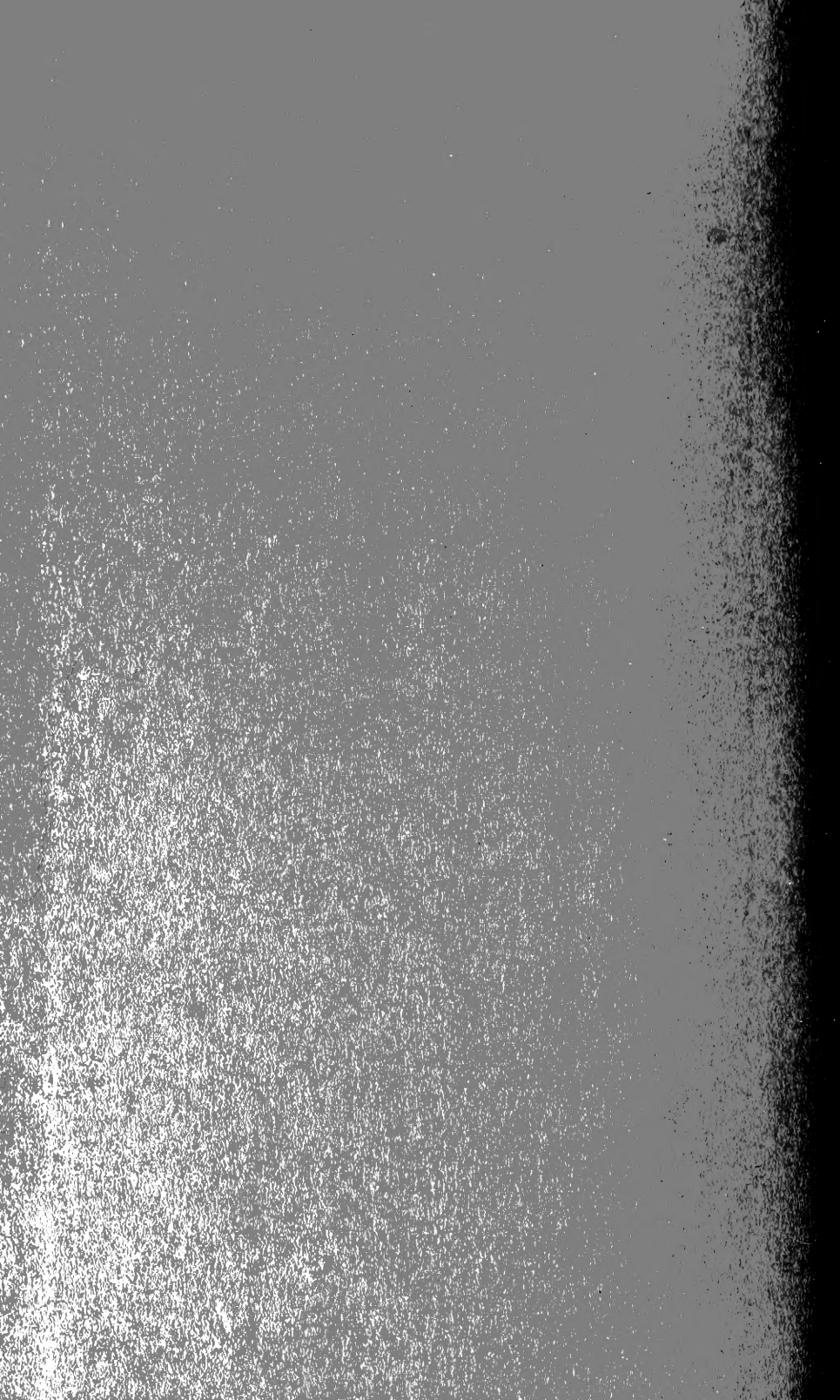
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